

# Promoting self-directed learning through the implementation of cooperative learning in a higher education blended learning environment

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May 2017

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# DECLARATION

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Signature

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Date

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## ACKNOWLEDGEMENTS

### **This dissertation is dedicated to:**

- The love of my life, Deon Bosch, who loved, encouraged and supported me throughout this journey. Thank you for being the shoulder to cry on when my motivation was low and for helping me to never give up. I would never have been able to complete this without you by my side. *Jy is my alles.*
- My child, Deon, to whom I sometimes did not give all the love and attention I would have wanted to. *Jy is die punt van my hart* and I love you to bits. Jacques, who by the time of submitting this thesis was one day away from being born. You were my inspiration to complete this study before we meet you so that I would be able to enjoy you and care for you the best that I possibly can from the day that you were born.
- My parents, Jackie and Cornie Tredoux, you are my role models in every aspect of my life. Your dedication and passion for teaching inspired me to become a teacher and to continue my studies in this field. You always believed in me even when I was ready to give up.

### **I would hereby like to thank:**

- My supervisor, Prof Elsa Mentz, for inspiring and encouraging me to keep striving for the goal, and who gave me her invaluable time, support and guidance, without which this dissertation would not have been possible.
- My co-supervisor, Dr Gerda Reitsma, who was always willing to share her time, expertise and knowledge.
- Dr Suria Ellis, for her help and guidance with the quantitative research.
- My friends and family who encouraged and supported me.
- My heavenly Father for His strength and insight.

***Soli Deo Gloria***

# ABSTRACT

## **Promoting self-directed learning through the implementation of cooperative learning in a higher education blended learning environment**

Within higher education institutions there is currently a movement towards blended learning. Higher education institutions that were previously known for focussing on a face-to-face mode of delivery, now also move towards new internet-based technologies for teaching and learning. There is little reason to believe that information and communication technologies (ICT) will not be the defining transformative innovation for higher education in the 21st century. However, using new technologies does not necessarily improve the standard of courses. Courses need to be redesigned and redeveloped with reference to pedagogical theories.

The aim of this study was to evaluate the influence of cooperative learning (CL) in a blended learning (BL) environment on students' intrinsic motivation (IM) as characteristic of a self-directed learner (SDL). This study concluded that when using online technologies, teaching strategies should be adapted to the new opportunities offered by such technologies. When planning learning experiences, the educator needs to assist students in identifying their learning needs and taking responsibility for their own learning. Students who are intrinsically motivated will assume responsibility for their own learning process and will have a higher level of self-directedness. CL is one of the teaching strategies that empower students to develop to their fullest potential through the interaction, support and confidence they gain. Although extensive research has been done on the implementation of CL in a face-to face classroom, few studies could be found on the implementation of CL in a blended learning environment. Therefore, from the synthesis of BL literature, the researcher proposed a combined BL design model. This model integrates a number of BL design principles, IM aspects and CL elements into one model.

A mixed-method research approach was used in the empirical study. The intervention consisted of the redesigning of the first year economics module ECON 121 into a BL environment with a specific focus on CL and its influence on IM. Students were expected to complete an IM and a SDL questionnaire at the beginning and again at the end of the semester. Semi-structured interviews were later conducted with participants from the

experimental group to elaborate on some of the questions and issues addressed in the quantitative questionnaire.

The quantitative data showed a tendency that the students from the experimental group have a slightly higher mean score than the control group in the post-tests. The value of the intervention was confirmed by the analysis of the qualitative interviews, which showed that most of the students who took part in the interviews displayed good SDL skills. They saw that by taking part in the team challenge, a key component of the intervention, they would benefit in the long run and that it will expose them to opportunities that assist them to explore their knowledge and skills. The students realised that by working together in groups, they could help each other to achieve the outcomes without having to wait for the facilitator to assist them. The students were motivated to do their part, learn more and achieve good results. They understood that it was their own responsibility to excel in the module, and they were willing to do whatever it took to do so.

**Key words:**

SDL; intrinsic motivation; CL; BL; teaching strategies; higher education; mixed-method research approach

## OPSOMMING

### **Bevordering van selfgerigte leer deur die implementering van koöperatiewe leer in 'n hoërondewys-vervlegteleeromgewing**

Daar is tans in hoërondewysinstellings 'n toenemende neiging na vervlegte leer. Hoërondewysinstellings wat voorheen daarvoor bekend was dat hulle van 'n aangesig-tot-aangesig-afleweringsmodus gebruik gemaak het, beweeg nou ook na nuwe internetgebaseerde tegnologieë vir onderrig en leer. Dit is heel waarskynlik so dat inligtings- en kommunikasietegnologieë (IKT) die bepalende transformerende innovasie vir hoër ondewys in die 21ste eeu gaan wees. Die gebruik van nuwe tegnologieë verbeter egter nie noodwendig die standaard van kursusse nie. Kursusse moet met verwysing na pedagogiese teorieë herontwerp en herontwikkel word.

Die doel van hierdie studie was om die invloed van koöperatiewe leer (KL) in 'n omgewing van vervlegte leer (VL) op studente se intrinsieke motivering (IM) as karaktereienskap van 'n selfgerigte leerder (SGL) te evalueer. Hierdie studie het gevind dat, indien daar van aanlyn tegnologieë gebruik gemaak word, onderrigstrategieë aangepas moet word na gelang van die nuwe geleenthede wat daardie tegnologieë bied. As leerervarings beplan word, moet die opvoeder studente help om hul leerbehoefes te identifiseer en om verantwoordelikheid te neem vir hulle eie leer. Studente wat intrinsiek gemotiveerd is, sal verantwoordelikheid neem vir hul eie leerproses en sal 'n hoër vlak van selfgerigtheid hê. KL is een van die onderrigstrategieë wat studente bemagtig om tot hul volle potensiaal te ontwikkel deur die interaksie en ondersteuning wat dit bied; dit kan ook help om studente se selfvertroue te laat ontwikkel. Alhoewel daar reeds omvattend navorsing gedoen is oor die implementering van KL in 'n aangesig-tot-aangesig-klaskamer, kon min gepubliseerde navorsing oor die implementering van KL in 'n vervlegteleeromgewing gevind word. Om hierdie rede het die navorser uit die sintese van VL-literatuur 'n gekombineerde VL-ontwerpmodel aan die hand gedoen. Hierdie model integreer 'n aantal VL-ontwerpbeginsels, IM-aspekte en KL-elemente in één model.

'n Gemengdemetodes-navorsingsaanslag is gebruik in die empiriese studie. Die intervensie het bestaan uit die herontwerp van die eerstejaar-ekonomiemodule EKON 121 na 'n VL-omgewing, met 'n spesifieke fokus op KL en die invloed daarvan op IM. Daar is van studente verwag om in die begin en weer aan die einde van die semester 'n IM- en 'n SGL-vraelys te voltooi. Semi-gestruktureerde onderhoude is later met deelnemers van die eksperimentele

groep gevoer om uit te wei oor sommige van die vrae en kwessies wat in die kwantitatiewe vraelys aan die lig gekom het.

Die kwantitatiewe data het getoon dat daar 'n neiging was dat die studente van die eksperimentele groep 'n effens hoër gemiddelde telling as die kontrolegroep in die natoetse gehad het. Die waarde van die intervensie is bevestig deur die ontleding van die kwalitatiewe onderhoude, wat aangedui het dat die meeste van die studente wat aan die onderhoude deelgeneem het oor goeie SGL-vaardighede beskik het. Hulle het ingesien dat deelname aan die spanuitdaging – 'n kernkomponent van die ingryping – langtermynvoordele vir hulle sou inhou en dat dit hulle sou blootstel aan geleenthede wat hulle sou help om hul kennis en vaardighede te verken. Die studente het besef dat, deur in groepe saam te werk, hulle mekaar kon help om die uitkomstes te bereik sonder om vir die dosent te wag om hulle te help. Die studente was gemotiveerd om hulle bydrae te maak, meer te leer en goeie resultate te behaal. Hulle het verstaan dat dit hulle eie verantwoordelikheid was om in die module te presteer, en hulle was bereid om te doen wat ook al nodig sou wees.

**Trefwoorde:**

Selfgerigte leer; intrinsieke motivering; koöperatiewe leer; vervlegte leer; onderrigstrategieë; hoër onderwys; gemengdemetode-navorsingsaanslag

## LIST OF ACRONYMS AND ABBREVIATIONS

ANCOVA	Analysis of covariance
ANOVA	Analysis of Variance
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CK	Content knowledge
CL	CL
CMIN/DF	Minimum sample discrepancy divided by degrees of freedom
IC	Interpersonal communication
ICT	Information and communication technologies
ICT	Information and communication technologies
IM	IM
IMI	IM inventory
LM	Learning motivation
LMS	Learning management system
NWU	North-west university
PCK	Pedagogical content knowledge
PK	Pedagogical knowledge
RMSEA	Root mean square error of approximation
SAMR	Substituting; Augmentation; Modification; Redefinition

SDL	SDL
SDT	Self-determination theory
SM	Self-monitoring
STAD	Student team–achievement divisions
TCK	Technological content knowledge
TK	Technology knowledge
TPCK	Technological pedagogical content knowledge
TPK	Technological pedagogical knowledge
ZPD	Zone of proximal development

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# CHAPTER 1

## INTRODUCTION AND PROBLEM STATEMENT

### 1.1 INTRODUCTION AND PROBLEM STATEMENT

There is currently a movement in higher education institutions towards blended learning (BL) (Geçer, 2013). BL is a learning environment that combines the advantages offered by internet-based, computer-assisted learning and face-to-face learning (Garrison & Kanuka, 2004). Higher education institutions that were previously known for focussing on a face-to-face mode of delivery are now also incorporating new internet-based technologies (Wang, 2008). Information and communication technologies (ICT) is likely to be the defining transformative innovation for higher education in the 21st century (López-Pérez et al., 2011).

However, using new technologies does not necessarily improve the standard of courses. Transformation and redesigning of courses for the online environment is vital to ensure that the benefits of on-line learning are fully exploited (Williams, 2010). Courses need to be redesigned and redeveloped with reference to pedagogical theories (Kort & Reilly, 2002). The revolution of ICT is a major challenge for the professional development of educators. Not only do they have to familiarise themselves with ICT, but they also need to acquire the necessary pedagogical expertise that is needed for effectively working in new technology-based learning environments (Virtič & Pšunder, 2009).

Educators should be familiar with a variety of teaching strategies in order to choose the appropriate one(s) for a specific group of students (Wang, 2009). Throughout history a number of teaching and learning strategies have been identified and refined for different learning environments. When using online technologies, teaching strategies should be adapted to the new opportunities offered by such technologies rather than adapting the technologies to fit the educator's current and traditional teaching strategies (Anderton, 2006). The combination of face-to-face instruction and online technologies in a BL situation create endless educational potential that reflect its pedagogical richness (Mortera-Gutiérrez, 2006).

The needs of students are the basis for learning, with greater emphasis on the learning process than the learning outcome (Armstrong, 2010). When planning learning experiences, the educator needs to assist students in identifying their learning needs and taking responsibility for their own learning (Murad & Varkey, 2008). An approach to education

where the student takes responsibility for their own learning process is called self-directed learning (SDL) (Knowles, 1975; Tredoux, 2012). Students who are metacognitive, motivationally and behaviourally active participants in their own learning process can be described as self-directed students (Loyens, 2008). Self-directed students determine their learning requirements and goals, decide upon their preferred learning strategies, select relevant resources to achieve the goals and assess their own learning outcomes (Ellis, 2007). Literature further suggests that one of the key determinants of SDL is intrinsic motivation (IM (Garrison, 1997; Oswald, 2003; Loyens, 2008). Students who are intrinsically motivated will assume responsibility for their own learning process and will have a higher level of self-directedness (Borich, 2007; Loyens et al. 2008; Francom, 2009; Song & Hill, 2007). Intrinsically motivated students will set their own goals and have the desire to gain deeper understanding of a topic in order to perform better during high-cognitive tasks (Herman, 2012). Educators should therefore design curriculum and instruction where students are motivated to participate in learning tasks (Liao, 2005). When students are intrinsically motivated, they will engage in a task because it is enjoyable and they find it inherently interesting (Hung et al., 2011).

There are a number teaching strategies or strategies that may allow students to become independent by setting their own goals and making plans to reach them, completing learning activities, monitoring their own learning processes and evaluating their own results (Francom 2009). Cooperative learning (CL) is one of the teaching strategies that empower students to develop to their fullest potential through the interaction, support and confidence they gain (Oswald, 2003; Merriam et al., 2007; Regan, 2003). CL is an approach that involves a small group of students working together as a team to solve a problem, complete a task or accomplish a common goal (Wessner & Pfister, 2000). According to a literature review done by Korkmaz (2012), CL contributes to students' academic success, cognitive skills, self-confidence, social skills, metacognition levels, problem solving skills, and ability to work in groups, positive attitudes towards learning and courses, and internal motivations.

The media vs method debate was started by Richard Clark and Robert Kozma in the early nineties. The basic idea of Clark's argument is that teaching methods have the greatest influence on learning. He asserts that "media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (Clark, 1983: 445). He further believes that there is strong evidence that many different types of media or technology can accomplish the same learning goal and therefore there is "no single media attribute that serves a unique cognitive effect for some learning task, then the attributes must be proxies for some other variables that are

instrumental in learning gains” (Clark 1994:22). Kozma on the other hand argues that media could and should be more than just a vehicle for delivery. He believes that the correct medium could have an impact on the student’s cognitive skills and that both the medium and method plays a crucial role in the design of instruction. Kozma's argument is based on the fact that certain media possess particular characteristics that make them both more and/or less suitable for the accomplishment of certain kinds of learning tasks (Kozma, 1994). For the purpose of this study, the researcher will not participate in this debate. However, the fact that the quantitative differences of the intervention were so small, might favour Clark’s argument. More attention should be given to the media vs method debate in future research.

Although extensive research has been done on the implementation of CL in a face-to face classroom, few studies could be found on the implementation of CL in a BL environment. A number of studies on the online learning environment found that “social presence” or involvement, where students feel part of a community, has contributed positively to learning outcomes and student satisfaction with online courses (Kazmer, 2000; Picciano, 2002; Tu and Corry, 2002). Song and Hill (2007) believe that online learning allows students to have more control of the instruction. In fact, the online learning context does not only influence the amount of control that is given to students, it also impacts on a student’s perception of his or her level of self-direction (Vonderwell & Turner, 2005). The above finding, together with the amount of online collaboration tools that are available on the internet opens up a number of possibilities for the implementation of CL in a BL environment. Because SDL is such a broad learning approach, it is difficult to include and effectively measure all the characteristic of SDL in one study (Tredoux, 2012). This study will therefore only focus on IM as a single aspect of SDL when evaluating student perceptions. Thus, the purpose of this study is to evaluate the influence of CL in a BL environment on students’ IM as characteristic of a self-directed learner.

## **1.2 REVIEW OF RELEVANT LITERATURE**

The movement towards BL environments provides educators and students with innovative learning opportunities to stimulate and enhance the teaching and learning process. Because the aim of this study is to evaluate the influence of CL in a BL environment on students’ intrinsic motivation, the literature study focuses on BL, CL and intrinsic motivation.

### **1.2.1 Blended learning**

The focus in higher education on the online component of learning is growing, and educators are obliged to challenge existing assumptions of the teaching and learning process in higher education (Garrison & Kanuka, 2004). Face-to-face classes are progressively being transformed into blended courses which integrates a certain amount of online teaching and student interaction (Ross, 2012). BL as defined by Procter (2003) is the effective combination of different learning styles, models of teaching and modes of delivery. The concept of BL is rooted in the idea that learning is a continuous process and not only a one-time event (Niemi, 2009). A single delivery mode inevitably limits the reach of a learning programme or critical knowledge transfer in some form (Geçer, 2013). There are many reasons why a blended approach to learning might be selected. According to Graham (2009), the three most general reasons for blending learning listed in the literature are: (a) to increase learning effectiveness, (b) to increase access to learning resources and (c) cost effectiveness.

While BL is appealing to many because it enables taking advantage of the “best of both worlds” (Gliner et al., 2002), BL environments can also mix the least effective elements of face-to-face and technology-mediated worlds if not designed well (Lindsay, 2004). Activities cannot be simply transferred from traditional learning environments into a technology-mediated environment without taking in consideration the impact of the technology on course content (Ross, 2012). Awareness of the communication between lecturers and students, the change in responsibilities as well as the constant change in technology itself are also necessary for successful transmission (Ross, 2012). The BL model should be designed on the understanding of the character and nature of the students, and the preparation of content and instructional design should take the experience and the prior knowledge of its self-directed students into consideration (Luppacini, 2007). Therefore, the effective design of instructional strategies plays a crucial role in the integration of teaching-learning processes in such a learning environment.

### **1.2.2 Cooperative learning**

CL is a pedagogical method where students are able to help themselves learn through the process of explaining the subject matter to other students and by learning from others (Riley & Anderson, 2006). One of the theories that CL is grounded in is the social cognitive theory with emphasis on the acquisition of social behaviour (Heath, 2010). According to Bandura (1977) people learn through observing others’ behaviour, attitudes, and outcomes of those behaviours. He states that by observing others, one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for action.”

(Bandura, 1977). Social cognitive theory emphasises the assumption that learning occurs in a social context and mostly through observation (Liao, 2005). Social outcomes such as the ability to work collaboratively with others, positive inter-group relations and the development of self-esteem are visible in CL (Wessner & Pfister, 2000). When working collaboratively, students can formulate their own ideas, discuss them with their fellow group members, receive immediate feedback, respond to comments and questions by their partner(s), and teach each other (Heath, 2010). All of the group members are engaged during a learning activity and the interaction is continuous. Through this interaction, students are able to engage in “deep learning” in which they are reshaping concepts and discovering new connections through the use of critical thinking skills (Mundy, 2012).

According to Johnson and Johnson (2009), CL is based on the following elements: (a) positive interdependence; (b) individual accountability; (c) promotive face-to-face interaction; (d) the appropriate use of social skills; and (e) group processing. Johnson and Johnson (2009) believe that positive interdependence exists when individuals are encouraging and facilitating their group members to complete tasks in order to reach the group’s goals. Johnson and Johnson (2009) propose five ways to coordinate students’ efforts to reach common goals. Students have to (a) get to know and trust each other, (b) accept and support their fellow students, (c) communicate accurately, and (d) resolve conflicts constructively. Each group member depends on the rest of the group while working together to complete the task (Wang, 2012). Johnson and Johnson (2009) further states that positive interdependence does not merely motivate individuals to try harder, but it also encourages more frequent use of higher cognitive strategies and the development of new perceptions and discoveries. Secondly, individual accountability occurs when each individual member is assessed and feedback is given to both the group and the individual to compare against a standard of performance (Johnson & Johnson, 2009). Educators use this to establish and maintain student responsibility for appropriate behaviour, engagement, and outcomes (Woo & Zellner, 2011). Thirdly, promotive interaction occurs when individuals encourage and facilitate their fellow group members’ efforts (Johnson & Johnson, 2009). Johnson and Johnson (2009) believes that promotive interaction occurs between students who are acting trustworthy, sharing and exchanging resources, and providing assistance to group members. Fourthly, interpersonal and small group skills are developed. These skills include listening skills, shared decision making, taking responsibility, communication skills, learning to give and receive feedback, and learning to encourage each other (Wang, 2012). Finally, group processing refers to time allocated to discussing how well the group members achieved their goals and maintained effective working relationships (Mundy, 2012). According to Johnson and Johnson (2009) group members should (a) reflect on the actions of group members –

those that were helpful and unhelpful and (b) decide which of these actions to continue or change. Johnson and Johnson (2009) states that the purpose of group processing is to clarify the processes necessary to achieve the group's goals and to improve on the effectiveness of the processes used.

The implementation of CL requires careful preparation, planning and guidance by educators (Yi & Luxi, 2012). The educator's role in CL generally includes specifying learning objectives, grouping students, explaining tasks, monitoring group work and evaluating cooperation and achievement (Ding et al., 2007). In According to Johnson and Johnson (2008), when facilitating CL, educators should: (a) make pre-instructional decisions on learning objectives, group sizes, roles of students, use of resources and classroom arrangement; (b) explain the task and positive interdependence, clarifying the assignment and criteria for success and explaining the expected social skills which are to be engaged in; (c) monitor students' learning and group interaction by intervening to provide assistance or to increase students' interpersonal and group skills; and (d) evaluate students' learning and help students to evaluate the interaction within the group. Only within a structured and meaningful group can students really be helped to understand how they can work together, contribute, accept responsibility for completing their part of the task and assist each other's learning in an environment that is supportive of its members (Johnson & Johnson 2003). Although the educator needs to plan and structure the learning experience, the role of the educator changes from an information-giving authority to a facilitator who provides assistance and intervention where necessary<sup>1</sup> (Felder & Prince, 2006). The CL facilitator should focus on stimulating the students' interdependence and interpersonal interactions and their individual accountability, and also on ensuring that the group operates properly (Yi & Luxi, 2012). The aim of the group learning should be for students to improve their existing knowledge and acquire sufficient interest and motivation to explore the subject matter more deeply (Ding et al., 2007).

### **1.2.3 Intrinsic motivation**

According to Unrau and Schlackman (2006), IM arises when an individual is interested in a topic or activity and is satisfied through pursuit of that topic or activity. IM in learning expresses a student's desire for mastery, spontaneous curiosity and inquiry (Unrau & Schlackman, 2006). Engaging in enjoyable, self-determined, and competence-enhancing

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1 For this reason, in this study the word "facilitator" will henceforth be used to refer to an educator making use of CL.

behaviour fosters this type of motivation (Kong et al., 2012). An intrinsically motivated person is moved to act for the fun or challenge entailed rather than because of external prods, pressures or rewards (Deci & Ryan, 2000). Intrinsically motivated students search for personal satisfaction in both the learning material and the learning process, and these students are likely to be more self-directed in their learning (Daly & de Moria, 2010).

IM not only exists within individuals but also in the relationship between individuals and activities (Deci & Ryan 2000). People might be intrinsically motivated for some activities but not for others, and not everyone is equally intrinsically motivated for any particular task (Yancy, 2012). When students are allowed to choose components that are of interest to them while working in small groups, their self-motivation is strengthened (Liao & Hsueh, 2005). In these groups, students share their strengths and expertise with others, thus increasing their IM and increasing the group's dynamics through this shared knowledge (Gillies & Boyle, 2010). These types of group activities enhance IM and keep students productively engaged, thus motivating them to learn emerging academic skills (Helm, 2004; Luis et al, 2011)

### **1.3 PURPOSE OF THE STUDY**

This study aims to evaluate the influence of CL in a BL environment on students' IM and SDL?

. To achieve this aim, the following sub-aims were identified:

- i) To identify how CL could improve intrinsic motivation.
- ii) To investigate how CL strategies can be adopted for a BL environment.
- iii) To determine the influence of the adopted CL strategies on IM and SDL in a BL environment.

The main research question that results from the research aims are: What is the influence of CL in a BL environment on students' IM and SDL?

In order to answer this research question, the following sub-questions need to be addressed:

- i) How can CL improve intrinsic motivation?
- ii) How can CL be implemented in a BL environment?
- iii) What is the influence of CL on IM and SDL in a BL environment?

## **1.4 RESEARCH DESIGN AND METHODOLOGY**

Because of the nature of CL, its focus on social skills and the fact that the researcher actively guided and supported the facilitators taking part in this study, the social-constructivist and in particular the social-constructivist research paradigm is appropriate for this study. Social-constructivism is defined as the view that all knowledge is dependent on human practices being constructed within the interaction between human beings and their world, and developed and transmitted within an essentially social context (Bashir et al., 2008). Social-constructivism assumes the creation of knowledge through interaction between the observer and the observed (Crnkovic, 2010). According to Kincheloe (2000), the angle from which an entity is observed and the values and preferences of the researcher that shape the questions are all factors in the construction of knowledge about the phenomenon in question. Thus, in this paradigm, research is a product of the values of the researchers and cannot be independent of them (Mertens, 2010).

The suitability of the use of social-constructivist paradigm for this study was determined by evaluating the paradigm by means of its ontology and epistemology. Ontology refers to “what exists and what is considered to be real”, while epistemology concerns the theory and the nature of knowledge – how people develop and accept it and the relationship between what is researched and those who research it (Bisman & Highfield, 2013). The social-constructive paradigm assumes that reality is constructed during interaction with the environment and with fellow students, making this paradigm suitable for this study, as discussed in more depth in chapter 5.

### **1.4.1 Literature study**

To reach sub-aims (i) and (ii) as stipulated in §1.3, extensive literature searches were conducted on: Google Scholar, EBSCOhost, ERIC, Academic Search Premier, Computers and Applied Sciences Complete, Google databases, catalogues of South African and international university libraries, Sabinet as well as the World Wide Web. The following key words were used: blended learning, cooperative learning; e-learning; information and communication technologies (ICT); intrinsic motivation; self-directed learning.

### **1.4.2 Empirical investigation**

The steps the researcher will follow when conducting the empirical study will be described in the next section. Attention will be given to Research Methods, Population and Sample, Measuring Instruments, Data Analysis, Ethical Aspects and Data collection procedures.

### 1.4.3 Research methods

A mixed-method research approach was used in the empirical study. Valid and reliable data were gathered to address the research question, the aim of the study, sub-aim (iii) and sub-aim (iv) as stipulated in §1.3. According to Johnson and Onwuegbuzie (2004), a mixed-method research design allows words to add meaning to numbers. By using this research design, more reliable evidence could be obtained and better conclusions could be provided through correlation and verification of findings. According to McMillan and Schumacher (2006), a mixed-methods research design is a combination of qualitative and quantitative methods. Researchers are therefore not limited to techniques associated with only one of the traditional designs. Johnson and Onwuegbuzie, (2004) states that a mixed-method approach does not attempt to replace either the quantitative or qualitative approaches but rather to minimize the weaknesses and use the strengths of both these methods. When data from both quantitative and qualitative approaches are used, the researcher gains a deeper understanding of the phenomenon (Hanson et al., 2005). Deeper insight and understanding can be added to aspects that might be missed when only a single research method was used. A mixed-method research approach therefore produces more comprehensive knowledge necessary to connect theory and practice (Johnson & Onwuegbuzie, 2004).

The mixed-method design of choice for this study was the explanatory design (QUANT→qual). The purpose of the explanatory mixed method design is to use qualitative findings to help clarify the quantitative results (Ivankova et al., 2010). The qualitative results were used to further elaborate on the quantitative findings.

For the purpose of this study, the quantitative data gathered from the IM questionnaire and the SDL questionnaire were analysed by using both descriptive statistical techniques as well as inferential statistics, and, where appropriate, effect sizes were calculated. Descriptive statistic techniques are used to determine the following about data: points of central tendency, the amount of variability and to what extent different variables are related to each other (Leedy & Ormrod, 2010). According to McMillan and Schumacher (2006), inferential statistic techniques depend on descriptive statistics and are used to make predictions about the similarity of a sample to the population from which it is drawn. After the analysis of the quantitative data were completed, the qualitative data were collected by means of interviews and analysed to verify the data from the questionnaires. A full report of findings was written at the end of this process.

#### 1.4.4 Population and sample

This study was conducted at the North-West University, Potchefstroom campus, South Africa. Participants were selected by means of convenience sampling. In convenience sampling a group of respondents is selected on the basis of being available, for example, a university class (McMillan & Schumacher, 2006). The participants for this study were all the students enrolled for the economics module ECON 121 for 2014 and 2015. This economics module is compulsory for all first year students enrolled for studies at the School of Economics in the Faculty of Economic and Management Sciences, with about 1 500 students enrolled per year. There were four lecturers, each responsible for a group(s) of 200-400 students. One of the lecturers took part in the intervention (Lecturer A). The students from Lecturer A's group in 2014 were the first control group ( $C_1$ ) and received no intervention. The rest of the students (in Lecturer B-D's groups) enrolled for ECON 121 in 2014 served as the second control group ( $C_2$ ) and received no intervention. In 2015, the students from Lecturer A's group were the experimental group ( $E_1$ ) which received the intervention. The remaining students (Lecturer B-D's groups) enrolled for ECON 121 in 2015 served as the third control group ( $C_3$ ) and received no intervention.

##### *Quantitative research*

The quantitative research followed a quasi-experimental non-equivalent groups, pre-test, post-test, control and comparison design. According to McMillan and Schumacher (2006), this design allows the research to be conducted on previously established groups. The control as well as the experimental groups were subjected to a pre-test, after which only the experimental group received an intervention in the form of the implementation of CL in a BL environment. The post-test was then again administered to both groups. The study was conducted over two years, 2014 and 2015. Since the two groups come from different student cohorts, as described above, which could influence both the validity and the reliability of the research negatively, the following was done to compensate for possible differences in groups:

- Inferential statistics, e.g. ANCOVA, were performed to partial out the effect of differences between the two groups from different years.
- The questionnaire and individual semi-structured interviews for both cohorts were conducted at approximately the same time of the year – at the beginning of the semester and again at the end of the semester.

### *Qualitative research*

Participants for the qualitative research were selected from the population by simple random sampling to participate in individual, semi-structured interviews. A random sample is one in which every member of the population has an equal chance of being selected (Leedy & Ormrod, 2010). The researcher conducted individual semi-structured interviews with nine participants from the experimental group to get a better understanding of the data collected from the quantitative research.

#### **1.4.5 Measuring instruments**

##### *Quantitative research*

The respondents in the study were asked to complete two questionnaires. The first questionnaire was on the SDL instrument (SDLI) as published by Cheng et al. (2010). This questionnaire consists of 20 questions that are scored on a five-point Likert scale (5-Strongly agree / 4-Agree / 3-Neutral / 2-Disagree / 1-Strongly disagree).

The second questionnaire was on IM inventory (IMI), as published by Ryan (1982). The questionnaire consists of 45 questions that are scored on a seven-point Likert scale. The instrument assesses respondents' interest/enjoyment, perceived competence, effort, value/usefulness, felt pressure and tension, relatedness, and perceived choice while performing a given activity, thus yielding six subscale scores.

##### *Qualitative research*

Individual semi-structured interviews based on the above-mentioned questionnaires were conducted by the researcher. Participants were encouraged to elaborate on some of the questions and issues addressed in the questionnaire.

#### **1.4.6 Data analysis**

##### *Quantitative research*

The raw data from the questionnaires were captured on a spreadsheet in MS Excel™ and the data were processed by the Statistical Consultation Services of the North-West University. Descriptive statistical techniques, reliability and validity of each of the instruments were performed. A confirmatory factor analysis, correlation and fit indices were performed to construct validity of the instrument used in this study. Inferential statistics, e.g. dependent and independent t-tests, ANCOVA and cross tabulations, were used to compare

experimental and control groups as well as associations with biographical variables. Because of the large sample sizes and the non-probability sampling design, effect sizes were calculated to determine practically significant differences.

The quantitative data were analysed by means of dependent and independent t-tests. According to McMillan and Schumacher (2006), an independent t-test is used to determine whether the mean value of a variable in one group of subjects differs from the mean value of another group of subjects. A dependent t-test is used when two measurements are made on the same member (e.g. pre- and post-tests), and it implies that each individual observation of one sample has a unique corresponding member in the other sample (McMillan & Schumacher, 2006).

For the purpose of this study, a dependent t-test was conducted on the pre-test and post-test of each of the control groups as well as on the experimental group to determine the differences in students' IM and SDL skills. Students were required to include their student number in the questionnaire so that the difference between the pre-tests and post-tests in each of the questionnaires could be determined.

An independent t-test was then performed on the results of the pre-test of the control group and the pre-test of the experimental group in a specific year and between the two control groups in the previous year. It was used to determine whether the students from the two control groups in the first year had the same level of IM and SDL skills as well as whether students from the control group in the second year differed from the students from the experimental group to begin with.

An ANCOVA was also performed on the results of the post-test of the control groups and the post-test of the experimental group, partialling out differences between the pre-tests of the two groups. This was done to determine the influence that the intervention had on the experimental group.

#### *Qualitative research*

The data from the interviews were analysed by means of inductive analysis. The interviews were recorded, transcribed and then analysed. The data were coded according to themes and the coded data were categorised into families. These families were grouped under the main factors used in the quantitative research to see whether the qualitative data supported the quantitative findings (Hanson et al., 2005).

After both the qualitative and quantitative data were analysed to obtain a better understanding of the data gathered in this study.

#### **1.4.7 Ethical aspects**

The research was conducted in accordance with the ethical codes as stipulated by the ethical committee of the Faculty of Education of the North-West University. The following factors were considered:

- Respondents were informed about the nature of the study.
- The questionnaires were submitted to the North-West University's ethics committee and permission was obtained to conduct this research as part of the newly established research entity, SDL, in the Faculty of Education Sciences.
- Although the students were required to include their student numbers in the questionnaire for the pre-test post-test comparison, the students' confidentiality and privacy were respected at all times and the identity of students will remain confidential.
- Permission from the relevant deans and staff of the faculties and students were attained.
- Participation in the study was optional.
- Respondents had the option to withdraw from the study at any stage.

#### **1.4.8 Data collection procedure**

The data for this study were collected by using the following procedure:

##### *Quantitative data*

The SDL questionnaire (Cheng et al., 2010) and IM questionnaire (Ryan, 1982) were made available to students to complete online.

Control groups (C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>):

- 1) Students completed the questionnaires when the module started at the beginning of the semester (pre-test).

- 2) Students followed the course of the module throughout the semester.
- 3) Students completed the same questionnaires at the end of the semester (post-test).

Experimental group ( $E_1$ ):

- 1) Students completed the questionnaires when the module started at the beginning of the semester (pre-test).
- 2) Students followed the course with the implementation of the intervention throughout the semester.
- 3) Students completed the same questionnaires at the end of the semester (post-test).

#### *Qualitative data*

Individual, semi-structured interviews were conducted with the selected students.

Experimental group ( $E_1$ ):

Individual, semi-structured interviews were conducted by the researcher at the end of the module to get a deeper understanding of the students' learning experiences during the module. The interviews were conducted by the researcher to obtain the students' experiences in the most accurate way possible. The interviews were recorded on a voice recorder and transcribed by the researcher.

#### **1.4.9 The role of the researcher**

This study was conducted on the students enrolled for the ECON 121 module. The selection of the ECON 121 module was based on a) The large number of students enrolled for the course, (b) The students was divided into different groups and could be used for the experimental and control group and (c) There were different lecturers assigned to the group.

The first role of the researcher was to do an in-depth literature study to propose how to implement CL in a BL environment. The researcher collaborated with the lecturer responsible for the experimental group of the ECON 121 students to implement the intervention.

Because of the mixed method approach in this study, the role of the researcher changed when working with the two different components of the study. For the quantitative part of the

study, the researcher administered the data collection process by distributing and collecting both the SDL and IM questionnaires. The analysis of the data using inferential statistics and confirming the validity and reliability were done. Finally the results were interpreted and reported based on the established values for statistical significance.

For the qualitative part of the study, the researcher was more involved with the students. The individual, semi-structured interviews were conducted by the researcher, and some of the researcher's insight and findings on the topics were reflected in the questions asked. The data analysis of the interviews was done according to the process of inductive analysis and extensive verification procedures, including triangulation of data sources to establish the accuracy of the findings.

## **1.5 CONTRIBUTION OF THE STUDY**

This study will contribute to (a) the subject area or discipline and (b) the research focus area and (c) the strategic plan of the North-west University in the following way:

### **1.5.1 Subject area or discipline**

This study provided valuable information on students' intrinsic motivation. It determined the relationship between students' IM and their SDL readiness. These findings can have resulted in guidelines for facilitators implementing CL in a BL environment which will have a positive effect on students' intrinsic motivation.

### **1.5.2 Research focus area**

The study contributed towards the research output of the newly established research entity, SDL, in the Faculty of Education Sciences as IM is one of the important characteristics of a self-directed student. Furthermore, research on CL forms part of one of the sub-programmes in the SDL research entity.

### **1.5.3 Literature**

This study may lead to the publication of a number of research articles which will contribute to the fields of SDL, IM and BL.

#### **1.5.4 Strategic plan of the North-West University**

The teaching-learning framework of the North-West University states that “[p]rogrammes are delivered by means of a blended mode, which can include a combination of face-to-face contact between lecturer and student, distance learning and/or e-learning” (NWU, 2009:11). The findings of this study can result in practical guidelines for implementing CL in a BL environment.

### **1.6 STRUCTURE OF THE THESIS**

The structure of this thesis is as follows:

Chapter 1: Introduction

Chapter 2: CL to enhance intrinsic motivation

Chapter 3: CL in a BL environment

Chapter 4: The implementation of CL in a BL environment to enhance intrinsic motivation.

Chapter 5: Research design and methodology

Chapter 6: Results and analysis

Chapter 7: Conclusions and recommendations

## **CHAPTER 2**

# **COOPERATIVE LEARNING TO ENHANCE INTRINSIC MOTIVATION**

### **2.1 INTRODUCTION**

It is evident from chapter 1 that students who are intrinsically motivated assume responsibility for their own learning process and have a higher level of self-directedness (§1.1). Intrinsically motivated students express the desire to reach higher goals and to gain deeper understanding of a topic (§1.2.3). Cooperative learning (CL) is a teaching strategy that contributes to students' academic success and internal motivation (§1.1) by fostering students to continuously seek learning beyond what is needed for daily living and assisting them in being intrinsically motivated and self-directed (§1.2.2).

As stated in sub-aim (i), this study wants to identify how CL could improve intrinsic motivation. To reach this sub-aim, this chapter starts with a literature study to give a brief history of CL (§2.2) and discusses a number of theories that underlie it (§2.3). The essence of CL is discussed (§2.4) with focus on the basic elements of CL (§2.4.1), the role of the facilitator (§2.4.2) and a few CL techniques (§2.4.3) after which the benefits of CL will be listed (§2.4.4). Motivation (§2.5) will also briefly be discussed, in particular intrinsic motivation (IM) (§2.5.2) and its relationship to self-directed learning (SDL) (§2.5.4) and CL (§2.5.5), A short discussion on how to enhance IM is also included (§2.5.3.5). After all these aspects have been taken into consideration, a discussion on how to implement CL to improve IM follows (§2.6).

### **2.2 BRIEF HISTORY OF COOPERATIVE LEARNING**

CL theory has a long history that dates back thousands of years. According to Johnson, Johnson and Holubec (1998), the concept of CL was first proposed by Socrates. His students were taught in small groups and he encouraged them to engage in dialogues. The Roman philosopher Seneca also advocated CL by stating that when you teach, you learn twice (Felder, 2001). Early in the 17<sup>th</sup> century, Johann Amos Comenius, a pedagogical reformer, stated that students would benefit more by teaching others than by only being taught. Although he was a religious leader, he emphasised educational cooperation in his writings (Liao & Hsueh, 2005).

CL was introduced in England in the 18<sup>th</sup> century when Joseph Lancaster and Andrew Bell opened schools that investigated the use of peer learning groups (Holubec, 1998). The idea of peer learning was brought to America when Lancaster and Bell also founded a school in New York (Liao & Hsueh, 2005). In the last three decades of the 19<sup>th</sup> century, Colonel Francis Wayland Parker advocated the application of CL because he believed that enthusiasm, idealism, practicality and democracy should be incorporated into classroom education (Liao, 2005). John Dewey also advocated the employment of peer learning during that time. In the meantime, research on the impact of competitive, individualistic and cooperative efforts was conducted in the late 1800s by Turner in England and in the early 1900s by Mayer in Germany and Ringelmann in France (Johnson et al., 1998). However, in the early 20<sup>th</sup> century, there was a shift in American educational practices when education was influenced by organisations in the business sector (Bawn, 2007) and the interest in peer learning dried out.

A few decades later in the 1960s, interest in peer learning was rekindled because educators were seeking ways to construct social integration between minority and majority students in public schools in America (Liao, 2005). Several research groups in the United States were founded to examine CL groups in a classroom environment (Liao, 2005). David and Roger Johnson from the CL centre at the University of Minnesota developed the *Learning Together Technique* (Johnson & Johnson, 1987). David De Vries, Keith Edwards and Robert Slavin from the Centre for Social Organisation of School at the John Hopkins University developed the Team-Games-Tournament (De Vries, Edwards & Slavin, 1978) and Student Teams Achievement Divisions (Slavin, 1977). Elliot Aronson and his associates from the University of Texas developed the jigsaw method (Aronson, 1978). Another group of researchers from Tel-Aviv University in Israel, Shlomo Sharan, Yael Sharan, and Rahil Hertz-Lazarowitz, developed Group Investigation by refining Dewey's cooperative model (

Sharan & Hertz-Lazarowitz, 1980). Robert Slavin (1995) also continued his work by focusing on the goal setting and motivational aspects of CL and made a vast contribution to the field.

From the 1980s to the early 2000s, David and Roger Johnson did most of the influential work in CL. Even though an immense number of CL studies by other researchers can be found, they currently remain the leaders in this field of study.

### **2.3 UNDERLYING THEORIES OF COOPERATIVE LEARNING**

Four theoretical perspectives have guided research on CL, Namely: (a) social interdependence theory, (b) cognitive-developmental theory, (c) the behavioural learning

theory and d) motivational theories (Johnson *et al.*, 1998; Slavin, 1995). A brief discussion of each will follow in the sections below.

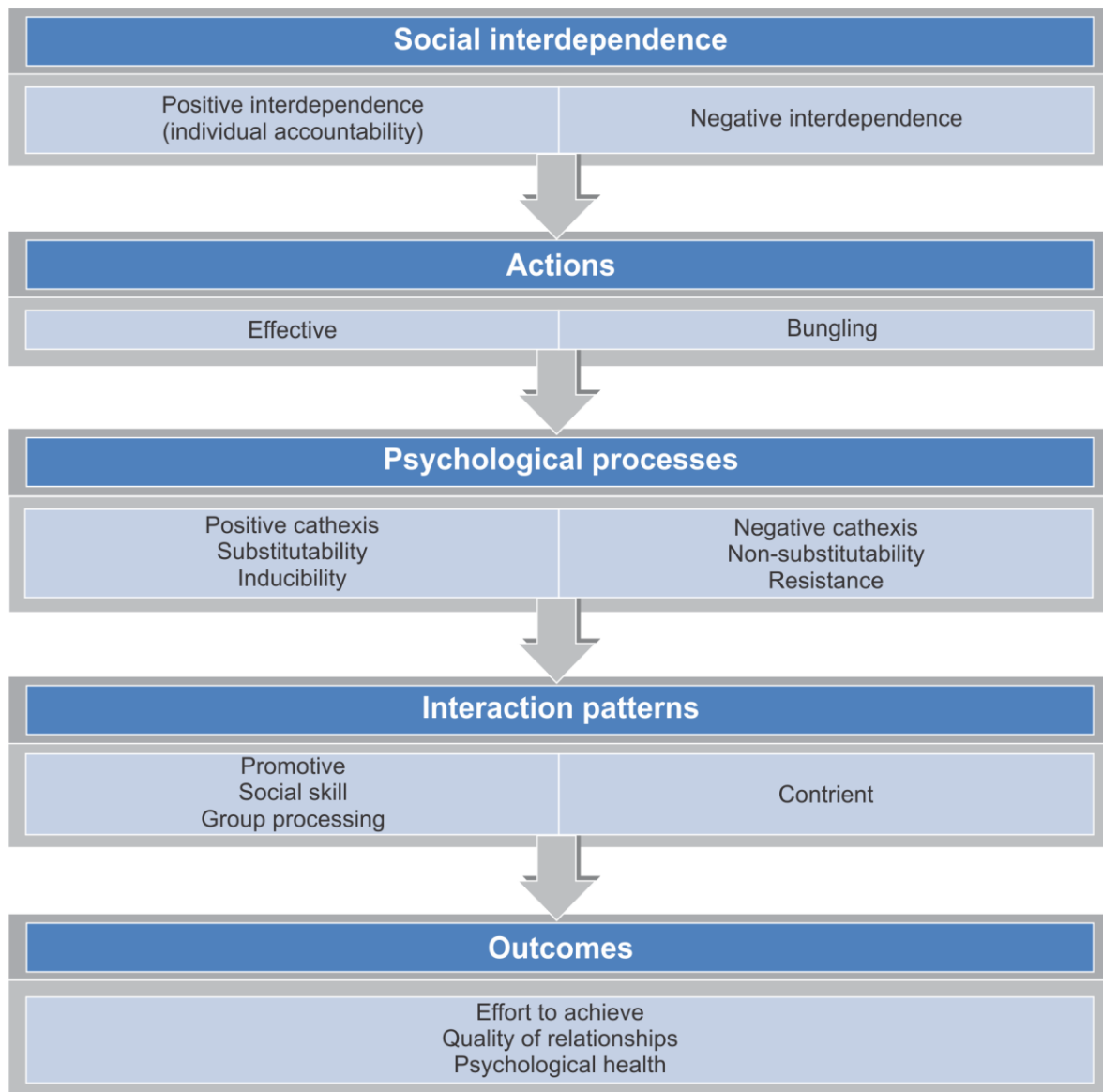
### **2.3.1 Social interdependence theory**

The historical roots of the social interdependence theory can be traced back to the early 1900s. Kurt Koffka and a team of researchers from the University of Berlin started working on *Gestalt* psychology. They believed that humans developed organised and meaningful views of their world by observing events not as a summation of parts or properties but as integrated wholes (Johnson & Johnson, 2009). Koffka (1935) proposed that groups were dynamic wholes in which the interdependence among members could vary. Kurt Lewin (1935) also built on the principles of *Gestalt* and said that interdependence among members is the essence of a group, which results in the group being a dynamic whole. If the state of any member of the group changes, it establishes a change in state of any other member of the group (Lewin, 1935). Lewin (1935) further suggests that a state of tension arises when members perceive their common goals and that it motivates movement towards the accomplishment of those goals.

Morton Deutsch (1949) continued the research in this field. According to Deutsch (1949), the essence of the social interdependence theory is that the way in which group members interact is determined by how participants' goals are structured, and the pattern of the interaction determines the outcomes of the situation. In Figure 2.1, a graphical overview of Deutsch's social interdependent theory, as published by Johnson and Johnson (2005), is given. As seen in Figure 2.1, he identified two types of social interdependence, namely: (a) positive interdependence and (b) negative interdependence, which are placed on a continuum. Positive interdependence is established when each group member is learning to depend on the rest of the group while completing a task (Wang, 2012). With positive interdependence, individuals perceive that they can only reach their goals if the other members in the group with whom they collaborate reach their goals as well (Johnson & Johnson, 2009). Johnson and Johnson (2009) further states that because individuals encourage and facilitate each other's efforts to complete a task or to reach a goal, it results in promotive interaction. Negative interdependence exists when individuals perceive they can only reach their goals if the other members in the group with whom they collaborate fail to reach their goals as well (Johnson & Johnson, 2009). Johnson and Johnson (2009b) further states that negative interdependence usually results in individuals discouraging and hindering other group members in order to reach or attain their goals.

Out of social interdependence, Deutsch proposed a second continuum of two basic types of actions by an individual. If an action is effective, it improves the person's chances to obtain a goal, but when it is bungling, it will decrease the chances to obtain the goal (Johnson & Johnson, 2005). Social interdependence and types of action then influences the psychological processes and interaction patterns among individuals. Psychological processes consist of three aspects, namely: (a) substitutability, (b) cathexis and (c) inducibility. According to Deutsch (1949), substitutability refers to the degree to which actions of one person substitutes or compensate for the actions of another person. Cathexis refers to the investment of psychological energy in objects outside of the person self, such as friends, family or work (Deutsch, 1949). Lastly, inducibility refers to the openness to being influenced and to influence others. The positive or negative manner in which people react concerning these aspects will influence the chances of the group to obtain the goal (Johnson & Johnson, 2005).

Interaction patterns determine the outcomes of the situation. These patterns include (a) promotive interaction, (b) social skill, (c) group processing, and (d) contrient interaction. Promotive interaction occurs as individuals encourage and facilitate each other's efforts to accomplish the group's goals (Johnson, Johnson & Smith, 2013). Contrient interaction, on the other hand, refers to individuals engaging in actions that reduce the likelihood of others' successful achievement of the joint goal; individuals focus both on increasing their own productivity and on preventing any other person from producing more than they do (Johnson, Johnson & Smith, 2013).



**Figure 2.1 Deutsch's overview of social interdependent theory (Johnson & Johnson, 2005:289)**

The appropriate use of social skills such as (a) getting to know and trust each other, (b) communicating accurately and unambiguously, (c) accepting and supporting each other and (d) resolving conflicts constructively (Johnson & Johnson, 2005) is needed for high quality cooperation. The purpose of group processing is to clarify and improve the effectiveness with which members carry out the processes necessary to achieve the group's goals. The direct and indirect interaction patterns are determined by the way in which goals are structured. Thus, the outcomes are the consequences of the interaction (Johnson & Johnson, 2005). Group goals are an essential component of CL and the success for the group results in increased knowledge or achievement for fellow students (Duckworth, 2010).

### **2.3.2 Cognitive developmental theory**

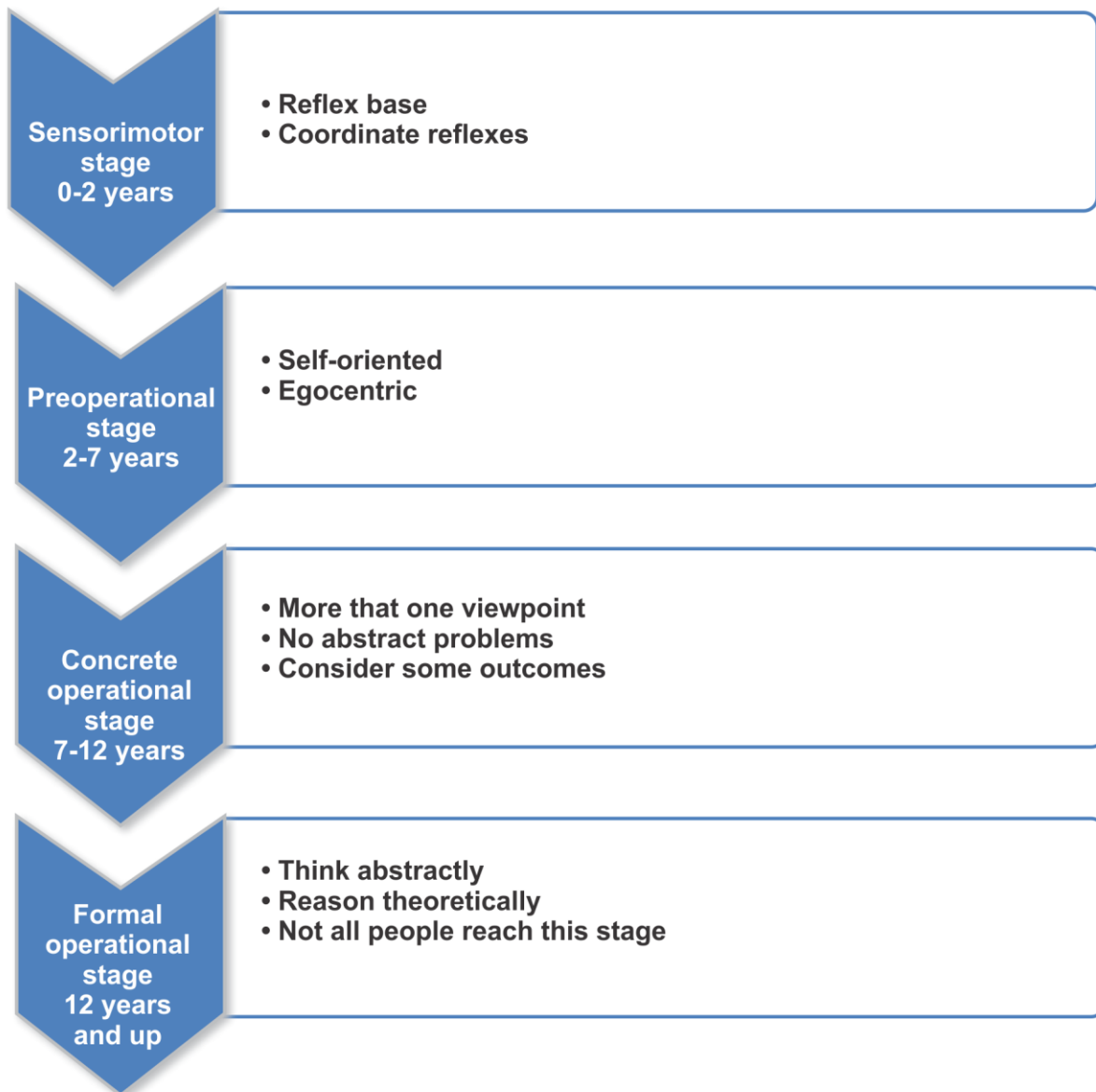
Cognitive developmental theory is based on the work of Jean Piaget (1920s) and Lev Vygotsky (1930s). Piaget suggested that when people work together, conflict and conflict resolution occur. Vygotsky suggested that knowledge is a societal product (Johnson, Johnson, & Holubec, 1998) which is constructed from cooperative efforts to learn, understand, and solve problems (Johnson & Johnson, 1998).

#### ***2.3.2.1 Piaget's cognitive developmental theory***

As seen in Figure 2.2, Piaget proposed four stages of cognitive development, namely: (a) sensorimotor stage, (b) preoperational stage, (c) concrete operational stage and (d) formal operational stage.

According to Piaget (1973), the sensorimotor stage extends from birth until a child is approximately two years old. During this stage, senses, reflexes and motor abilities develop rapidly. Intelligence is first displayed when reflex movements become more refined and understanding of the world involves only perceptions and objects which the infant has directly experienced (Piaget, 1973). Actions discovered first by accident are repeated and applied to new situations to obtain the same results.

Piaget (1973) believes that toward the end of the sensorimotor stage, the ability to form primitive mental images develops as the infant acquires object permanence. Until then, an infant doesn't realise that objects can exist apart from him or herself. The child in the preoperational stage is not yet able to think logically (Piaget, 1973). With the acquisition of language, children are able to represent the world through mental images and symbols, but in this stage, these symbols depend on their own perception and intuition. Preoperational children are completely egocentric. Although they are beginning to take greater interest in objects and people around them, they see them from only one point of view: their own. This stage may be the age of curiosity; pre-schoolers are always questioning and investigating new things. Since they know the world only from their limited experience, they make up explanations when they don't have one. It is during the preoperational stage that children's thought differs the most from adult thoughts.



**Figure 2.2 Piaget's stages for cognitive development**

The stage of concrete operations begins when the child is able to perform mental operations. Piaget (1973) defines a mental operation as an interiorised action, performed in the mind. Mental operations permit children to think about physical actions that they previously performed. Preoperational children could count from one to ten, but the actual understanding that one stands for one object only appears in the stage of concrete operations. According to Piaget (1973), operations are labelled "concrete" because they apply only to those objects that are physically present.

Piaget's final stage coincides with the beginning of adolescence and marks the start of abstract thought and deductive reasoning. Thought is more flexible, rational and systematic.

Individual can now conceive all the possible ways in which they can solve a problem and can approach a problem from several points of view (Piaget, 1973). Adolescents can think about thoughts and “operate on operations, not just concrete objects but also abstract concepts as space and time. Adolescents develop an inner value system and a sense of moral judgment. They now have the necessary “mental tools” for living their lives (Piaget, 1973).

### **2.3.2.2 Vygotsky’s social cognition learning model**

Researchers focusing on the cognitive-developmental theory have been interested in the relationship between cognitive development and social factors. One of the most influential theorists in this field, Lev Vygotsky, believed that development is a social process that starts at birth. Vygotsky’s social cognition learning model views culture as playing a key role in the development of cognition. He states that “[e]very function in the child’s cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra - psychological).” (Vygotsky, 1978). Vygotsky’s study of learning concentrates on the interplay between the individual and society, and how social interaction and language come into play in affecting learning or the development of cognition (Yilmaz, 2011). He further believes that this process of learning and development is assisted by others who have a better understanding or a higher ability level than the child with respect to a particular task, process or concept (Tudge & Winterhoff, 1993).

According to Tudge and Winterhoff (1993), Vygotsky believed that development is fostered by collaboration within the child’s zone of proximal development (ZPD). The ZPD refers to the distance between a student’s ability to perform a task under adult guidance and/or with peer collaboration and the student’s ability to solve the problem independently. The ZPD thus represents the potential levels of development of children or what they can achieve with assistance (Yilmaz, 2011). *Children’s new capacities can only be developed in the ZPD through collaboration in actual, concrete, situated activities with an adult or more capable peer (Vygotsky, 1978).* With enough assisted practice, the child internalises the strategies and language for completing a specific task, which then becomes part of the child’s psychology and personal problem-solving repertoire (Yilmaz, 2011). When this is achieved, the strategy enters students’ zone of actual development, because they are now able to successfully complete the task alone and without help and to apply this knowledge to new situations they may encounter (Shabani, Khatib & Ebadi, 2010).

Vygotsky's work on social cognition was further explored in subsequent works by other psychologists and it was used as the basis in developing the notion of scaffolding. Scaffolding is defined as assistance from experts that enables children to achieve what is beyond their ability to accomplish independently (Hannafin & Kim, 2011). Scaffolding will be discussed in §2.5 as part of CL techniques.

As seen in the sections above, the acknowledgement of the social aspect of constructivism is visible in the work of both Piaget and Vygotsky. They both believed that interaction among peers can lead to new construction of knowledge. CL takes advantage of active learning and social interaction to help students generate information with each experience (Duckworth, 2010).

### **2.3.3 Behavioural learning theory**

Behaviourism, also known as behavioural psychology, is a theory of learning based on the idea that all behaviours are acquired through conditioning (Cherry, 2007). Behaviourism assumes that a student is essentially passive, responding to environmental stimuli (Mohammad, 2012). They believe that students start off as clean slates and then their behaviour is shaped through positive or negative reinforcement which increases the probability that the particular behaviour will happen again (Lopes, 2010). Cherry (2007) states that according to behaviourists conditioning occurs through interaction with the environment and that our responses to environmental stimuli shape our behaviours. The main influential researchers on the behavioural learning theory were Ivan Pavlov (1849-1936), who investigated classical conditioning, John B. Watson (1878-1958), who rejected introspective methods and sought to restrict psychology to experimental laboratory methods, and B.F. Skinner (1904-1990) who gave ethical grounding to behaviourism, relating it to pragmatism (Culatta, 2011).

Behavioural theorists believe that because the explanations for learning lies in the environment and the individual's history, it does not necessarily include feelings and thoughts (Schunk, 2011). The behavioural learning theory is further based on the assumption that extrinsic motivation to achieve group rewards influences cooperative efforts (Heath, 2010). Students will work hard on those tasks for which they secure a reward of some sort and will fail to work on tasks that yield no reward or yield punishment (Johnson, Johnson & Smith, 1998). CL utilises this ideology to create groups that function well together (Johnson & Johnson, 2012). Students are rewarded for accomplishing goals set for the group, and

repeated goal accomplishment leads to more rewards (Duckworth, 2010). Students also have an incentive to work well and learn together to meet group goals (Duckworth, 2010).

### **2.3.4 Motivational theories**

Motivational perspectives on CL focus primarily on the reward or goal structures under which students operate (Slavin, 1995). From a motivationalists perspective, cooperative incentive structures create a situation in which the only way group members can attain their own personal goals is if the group is successful (Johnson et al., 1998; Slavin, 1995), In the following sections a few of the motivational theories that underpin CL will be discussed briefly.

#### ***2.3.4.1 Expectancy-value theory***

Expectancy-value theory was founded by John William Atkinson in the 1950s in an effort to understand the achievement motivation of individuals. The two key components in the expectancy-value theory to understand students' achievement, behaviours and academic outcomes are expectancies and task value (Eccles, Futterman, Kaczala & Meece, 1983; Eccles & Wigfield, 2000). Expectancies refer to the degree to which individuals are confident in accomplishing an academic task, while task value refers to the degree to which they believe that the academic task is worth pursuing (Nie & Lau, 2009). This model suggests that expectancies and values interact to predict important outcomes such as engagement, continuing interest and academic achievement (Eccles et al., 1983). The basis of this theory is that one's motivation to perform a learning task depends on two dimensions: expectancy of success in the given task, and the value attached to successfully performing the task (Dörnyei, 2006). Thus, the greater expectancy individuals hold about their success and the greater value they attach to the task, the stronger the motivation to learn and overcome learning barrier (Tuan, 2011).

Within the expectancy-value theory, utility value is considered a sub-component of task value. Utility value is determined by "how well a task relates to current and future goals" (Eccles & Wigfield, 2002). According to Holley and Olivier (2009), students who believe they are capable of mastering their schoolwork typically have positive expectations for success and, hence, high motivation and achievement. What further contributes to students' motivation and achievement is their valuing of an academic task, as well as the interface of their expectancies and task values.

### **2.3.4.2 Goal setting theory**

Edwin A. Locke began to examine goal setting in the mid-1960s and continued researching goal setting for thirty years. Locke derived the idea for goal-setting from Aristotle, who speculated that purpose can cause action. Locke therefore began researching the impact that goals have on individual activity.

Locke continued his research together with Rd. Gary Latham, and in 1990 they published their work, *A Theory of Goal Setting and Task Performance*. Their combined work pointed out a number of factors that could impact how one sets goals, namely:

- Role modelling - observing a high-performing role model brings about higher personal goal setting and higher commitment to difficult goals (Rakestraw & Weiss, 1981; Mueller, 1983).
- Competition - competition brings about higher personal goal setting (but not higher goal commitment) than no competition on a brainstorming task (Mueller, 1983).
- Group goals - having group goals on top of personal goals brings about higher goal commitment to the personal goals than having personal goals alone (Matsui, Kakuyama & Onglatco, 1987).
- Encouragement - encouragement and persuasion increase level of goal setting (Garland & Adkinson, 1987).
- Feedback - giving performance feedback brings about higher goal setting than not giving feedback (Erez, 1977).

Locke's research showed that there was a relationship between how difficult and specific a goal was and people's performance of a task. A goal is defined simply as what the individual is consciously trying to do (Locke & Latham, 2002). He suggested that specific and difficult goals led to better task performance than vague or easy goals (Locke & Latham, 2002). Locke & Latham (2002) further asserts that goals are effective even when they come from different sources: they can be assigned by others, they can be set jointly through participation and they can be self-set. In the latter instance, goals are a key element in SDL.

### **2.3.4.3 Self-determination theory**

Self-determination theory (SDT) (Deci & Ryan, 1985) is a humanistic theory of motivation and well-being. The central premise of the theory is that individuals have innate tendencies towards personal growth and vitality that are either satisfied or dissatisfied by their immediate environment (Hill, 2011). SDT examines the social-contextual factors that facilitate motivation through the three inner psychological needs of autonomy, competence and relatedness (Zhao & Shen, 2012). Autonomy is defined as freedom of choice (Walsh, 2011). Deci, Vallerand, Pelletier and Ryan (1991) found that autonomy is high when individuals feel they are engaging in exercise because they choose to do so, not because they feel pressured by other people or external factors. Competence is defined by a perceived self-belief in one's ability to perform well in an activity, and relatedness is defined by a sense of shared experience (Walsh, 2011). According to Deci and Ryan (2000), individuals exhibit optimal motivation and psychological well-being when all three of these psychological needs are met, whereas the opposite may occur if they are undermined (Deci & Ryan, 2000).

Within SDT, motivation varies along an internalisation continuum from intrinsic to external regulation (Hill, 2011). IM refers to the motivation to perform an activity for immaterial benefits, such as the enjoyment of the process of performing the activity itself (Hau, Kim, Leec & Kim, 2013). Extrinsic motivation, on the other hand, refers to behaviour that is energised by internal and external contingencies (Hill, 2011). Deci & Ryan (2000) found that the quality of experience and performance can be very different when one is behaving for intrinsic versus extrinsic reasons. They state that social contextual conditions that support one's feelings of competence, autonomy and relatedness are the basis for maintaining IM and becoming more self-determined with respect to extrinsic motivation.

In the following section on CL, the basic elements, the role of the educator, CL techniques and its relationship to motivation, in particular IM will be discussed.

## **2.4 COOPERATIVE LEARNING**

CL is the instructional use of small groups so that students work together to maximise their own and each other's learning (Johnson & Johnson, 2012). A CL approach in a classroom helps students to interact with each other, generate alternative ideas and make inferences through discussion (Kishore, 2012). Through CL, students help one another to discover knowledge together and benefit from this form of social participation (Sharan, 2010). However, all groups formed by a number of students sitting together are not necessarily cooperative groups (Kishore, 2012). Johnson and Johnson (1994) proposed five basic

elements of CL that a group should adhere to, to become cooperative group. These five elements are discussed in the following sections.

#### **2.4.1 Basic elements of cooperative learning**

According to Johnson and Johnson (1994), the five basic elements necessary for a lesson to be cooperative are: (1) positive interdependence, (2) individual accountability, (3) face-to-face promotive interaction, (4) social skills and (5) group processing. Research has shown that when these elements are properly implemented, group collaboration in the classroom can increase learning and achievement, social skills, self-esteem and attitudes toward classmates and school (Heath, 2010). Johnson et al. (2013) believe that understanding how to implement the five basic essential elements of CL enables facilitators to structure their lessons and adapt CL to their specific circumstances, needs and students.

##### ***2.4.1.1 Positive interdependence***

Positive interdependence exists when students feel that they are linked to their fellow group members and that they will not succeed if they don't coordinate their efforts with those of the group to complete a task successfully (Kishore, 2012). Students have to realise and believe that they should "sink or swim" together and to achieve the expected outcome, they have two main responsibilities, namely: 1) reach the assigned goal 2) ensure that all members of the group reached the assigned goal (Johnson & Johnson, 2012). When these two responsibilities are understood, students realise that each group member's efforts are required and indispensable for group success and that each group member has a unique contribution to make because of his or her resources and/or role and task responsibilities (Johnson & Johnson, 2012). Johnson and Johnson (2012) further distinguish different types of positive interdependence. The following four, namely 1) positive goal interdependence, 2) positive reward interdependence, 3) positive resource interdependence and 4) positive role interdependence are relevant to this study. Each of these aspects will be discussed shortly in the following sections.

##### ***Positive goal interdependence***

Individuals achieve more with positive goal interdependence than when they work individualistically (Johnson & Johnson, 2009) because students realise that they can achieve their learning goals only when all the members of their group also achieve their goals (Johnson & Johnson, 2012). The facilitator has to structure a clear mutual goal for the group

to ensure that students care about how much each group member learns and contributes (Johnson & Johnson, 2012).

### ***Positive reward interdependence***

Rewards are a distinguishing factor between strong and weak forms of interdependence (Brewer & Klein, 2006). According to Johnson and Johnson (1989), reward interdependence largely explains the relationship between cooperation and achievement. They believe that individuals will increase their achievement only if there is a specific group goal reinforcing them to do so. To establish positive reward interdependence, a mutual reward should be given for successful group work and members' efforts to achieve it (Johnson & Johnson, 2012). They believe that each group member should receive the same reward when the group achieves its goals but facilitators may wish to add joint rewards (e.g. if all members of the group score above a certain percentage on the test, each receives some bonus points). Johnson & Johnson (2012) advice facilitators to give students 1) an overall group grade for their mutual task, 2) an individual grade they receive for a test and 3) bonus points if all members of the group attain above a certain percentage on the test. The appropriate rewards have a positive impact on performance, attitude, and group processes (Brewer & Klein, 2006).

### ***Positive resource interdependence***

For this aspect of positive interdependence, each group member only has access to a specific portion of the resources that is necessary for the task to be completed (Johnson & Johnson, 2012). Thus the members' resources have to be combined for the group to achieve its goals. The jigsaw method is a good example of this aspect and will be discussed in §2.4.3 as part of CL techniques.

### ***Positive role interdependence***

Each member is assigned complementary and interconnected roles that specify responsibilities that the group needs in order to complete the joint task. Facilitators create role interdependence among students when they assign them complementary roles such as reader, recorder, checker of understanding, encourager of participation and elaborator of knowledge. Such roles are vital to high-quality learning.

The role of checker, for example, focuses on periodically asking each group mate to explain what is being learned. Rosenshine and Stevens (1986) reviewed a large body of well-controlled research on teaching effectiveness at the pre-collegiate level and found "checking

for comprehension" to be one specific teaching behaviour that was significantly associated with higher levels of student learning and achievement. Although the facilitator cannot continually check the understanding of every student, the facilitator can engineer such checking by having students work in cooperative groups and assigning one member the role of checker.

#### **2.4.1.2 Individual accountability**

Individual accountability shows students their personal responsibility for the group's goal (Johnson & Johnson, 2009). It involves two components: (1) each student is responsible for his or her own learning and (2) each student is responsible for helping the other group members learn (Abrami, Bernard, Bures, Borokhovski & Tamim, 2011). As an individual, each student is accountable for and will be individually assessed for a specific task or section of the work (Tsay & Brady, 2010). However, as a member of the group, they must help to coordinate the whole operation and ensure that the group task is completed (Yi & Luxi, 2012).

According to Onwuegbuzie, Collins and Jiao (2009), individual accountability is the key to the success of the overall group and helps to prevent reduced individual effort resulting from too much dependence on other group members. Like positive interdependence, individual accountability develops along a continuum from a facilitator-centred structure to a point where students assume responsibility for their own learning (Abrami et al., 2011). Wang (2012) states that to obtain individual accountability facilitators should establish and maintain student responsibility for appropriate behaviour, engagement and outcomes by the way they structure and facilitate tasks. Individual accountability allows the facilitator to determine if students are actually involved in the learning process, or if they are simply riding on the work of others (Heath, 2010). It is the key to ensuring that all group members become stronger and better prepared to complete assignments independently (Heath, 2010).

#### **2.4.1.3 Promotive interaction**

Although some of the responsibilities in CL may be done on an individual basis, most of the tasks are performed through an interactive process in which each group member provides feedback, challenges one another, and teaches and encourages his or her group mates (Tsay & Brady, 2010). Promotive interaction occurs when students' facilitate each other's efforts to succeed in the group's goal through supportive interaction (Johnson & Johnson, 2009). As the promotive interaction increases, so does peer accountability, and students

begin to feel responsible for the success of each other (Johnson & Johnson, 2009). They noted that during face-to-face promotive interaction there is less stress on the group members, they behave in a trustworthy way towards each other, and higher quality decision making is apparent. Group members exchange and challenge each other's ideas and provide positive feedback (Heath, 2010). According to Johnson and Johnson (2009a), positive interaction is characterised by group members who:

- act in trustworthy ways and create an environment with low anxiety and stress;
- provide efficient help and feedback to group mates in order to improve subsequent performance;
- share and exchange resources;
- are motivated to strive for mutual benefit;
- encourage each other to achieve mutual goals;
- challenge each other's reasoning and conclusions to promote higher order thinking skills;
- take the perspectives of other group members into consideration and explore different points of view as possibilities.

Positive interaction results in interpersonal processes such as modelling appropriate use of social skills, supporting and encouraging efforts to learn, and participating in joint celebrations of success (Johnson et al., 2013).

#### ***2.4.1.4 Appropriate use of social skills***

Effective cooperation is not only based on the completion of a task but also on the teamwork and interaction between group members (Johnson & Johnson, 2009). Students, therefore, must be taught the social skills needed for high-quality cooperation and be motivated to use these skills (Johnson & Johnson, 2009). For CL to be successful, students need to have interpersonal and small group skills, where individuals trust each other, make decisions, resolve conflicts and communicate effectively (Johnson, Johnson & Smith, 2013). Facilitators should develop and encourage social skills through the tasks given to students. These skills include listening, individual and shared decision making, taking responsibility, learning to give and receive feedback, and learning to encourage each other (Wang, 2012). The

development of social skills is essential when students work with classmates who have different learning skills, cultural backgrounds, attitudes and personalities (Baghheghi, Koohestani & Rezaei, 2011). Baghheghi et al. (2011) believe that working in heterogeneous groups promote student learning, and these differences force students to interact with group members that feel and think differently than themselves. Through this interaction they get to know and learn to trust each other, communicate accurately, accept and support each other, and resolve conflicts constructively (Yi & Luxi, 2012).

#### ***2.4.1.5 Group processing***

Group processing refers to the reflection on the contributions of group members on activities to assess who performed well and which actions should be continued or discontinued (Johnson & Johnson, 2009). Through this reflection students get feedback that they can consider and use to modify an activity to achieve their goal (Yi & Luxi, 2012). According to Nam & Zeller (2011), group processing has the potential to clarify and improve the members' effectiveness in achieving the group's goals. Johnson et al. (2013) state that group processing may result in reducing the complexity of the learning process, eliminating unnecessary and incorrect actions, improving team work skills and celebrating their success.

### **2.4.2 Role of the facilitator in cooperative learning**

Implementing CL methods requires facilitators to learn new behaviours and attitudes towards learning, not just new teaching techniques (Sharan, 2010). Sharan (2010) further states that the marked change in the facilitator's role in CL compared to traditional teaching methods and in the type of interaction between facilitator and students requires time, commitment, repeated practice and a network of support, encouragement and feedback. Johnson & Johnson (2005) propose three types of CL Namely, formal CL, informal CL and cooperative base groups. In the following sections, the role of the facilitator according to these three main types of CL (§2.4.2), a number of CL techniques (§2.4.3) and the benefits of CL (§2.4.4) are discussed.

#### ***2.4.2.1 Role of the facilitator in formal cooperative learning***

According to Johnson et al. (2013), formal CL refers to students working together in groups for a specific time. This time can vary from one single class period to several weeks. The purpose of these formal learning groups is to achieve shared learning goals and complete specific group tasks and assignments (Johnson et al., 2013). According to Johnson et al.

(2013), facilitators are responsible for specifying the lesson's objectives, making pre-instructional decisions, explaining the assignment and the importance of working together, offering assistance when necessary, and assessing students' learning. In the following sections the role of the facilitator in these formal CL groups are discussed.

### ***Make pre-instructional decisions.***

Group sizes in CL depend on several criteria: the age of the students, the task, the size of the class, the students' experience with CL and the social competence of the students (Schul, 2011; Nam, 2008; Duckworth, 2010). Thus, the optimal size of a cooperative group will vary according to the desired processes and outcomes.

According to Blatchford, Baines, Bassett, Rubie-Davies and Chowne (2006), there are essentially three types of groups regarding size namely (a) large groups, such as the whole class; (b) small groups, usually consisting of three to four students, and (c) pairs. These different group sizes are usually associated with phases of a lesson where, for example, the whole class comes together for the beginning and end of the lesson but smaller groups are used in the middle (Blatchford et al., 2006). According to Schul (2011), some group sizes are more ideal than others. He believes groupings of four or five members are small enough to allow everyone to take an active part in a discussion, yet large enough to provide the diversity of opinions, information, points of view, and background necessary for effective problem-solving. However, most well-known CL authors (Slavin, 1995; Cooper, et al., 1990; Johnson, et al., 1998), favour groups of four or less because larger groups do not provide an opportunity for all members to participate and enhance their skills. Guidelines on how to decide on the most appropriate group size for the specific task are given in §2.5.5.

The arrangement of the learning space should also be considered beforehand because it provides the facilitator with easy access to observe a group (Johnson & Johnson, 2009). The facilitator should also decide beforehand whether the groups will be homogeneous or heterogeneous as well as the method that will be used to assigning students to groups (Johnson & Johnson, 2009). The groups should be structured to create an environment with positive role interdependence (Johnson & Johnson, 2012). The facilitator has to decide on specific roles for group members to complete the joint task (refer § 2.4.1.2). These roles will differ according to the teaching strategies and CL techniques used for the specific lesson, some of which will be discussed in §2.4.3. The necessary resources for the lesson should also be identified. The way in which resource material is distributed or found can create resource interdependence (refer § 2.4.1.1).

### ***Explain the task and the positive interdependence.***

The facilitator should clearly define the assignment and explain the required concepts and strategies (Johnson et al, 2013; Ahmad, 2010). The importance of working together should be explained with regard to individual accountability (refer § 2.4.1.2), positive interdependence (refer § 2.4.1.1) and the expected social skills (refer § 2.4.1.3) to be used (Johnson et al., 2013). The facilitator should also give the criteria for success which will help the students to know exactly what is expected of them (Johnson et al., 2013; Denton, 2011). The objectives for the lesson should also be specified with regards to both academic and social skills (Johnson et al., 2013; Ding et al., 2010).

### ***Monitor students' learning and intervene to provide task assistance or to increase students' interpersonal and group skills.***

The facilitator should systematically observe and collect data on the interaction and working of the group while conducting the lesson (Johnson et al., 2013; Parolia, Jiang, Klein & Sheu, 2011). When needed, the facilitator intervenes to assist students in completing the task accurately and in working together effectively (Johnson et al., 2013; Yi & Luxi, 2012). The visibility of the facilitator promotes individual accountability (refer § 2.4.1.2), Students tend to feel accountable to be constructive if the facilitator observes a group (Johnson et al., 2013).

### ***Assess students' learning and help them process how well their groups functioned.***

Throughout the lesson, students' learning should be carefully assessed and their individual and group performances should be evaluated (Schul, 2011; Johnson et al., 2013). At the end of the lesson, the facilitator should bring closure and conclude the findings of the different groups (Johnson et al., 2013). The facilitator should then ensure that members of the learning groups discuss how effectively they worked together and how they can improve their communication, interaction and work methods in the future (Yi & Luxi, 2012; Johnson et al., 2013). During this group processing (refer § 2.4.1.5), students should not only focus on group accountability but also on individual accountability (refer § 2.4.1.2) which will indicate how well each student performed (Johnson et al., 2013).

#### ***2.4.2.2 Role of the facilitator in informal cooperative learning***

According to Johnson et al. (2013), informal CL refers to students that work together to achieve a joint learning goal in temporary, ad-hoc groups. These groups tend to last from a few minutes during a lesson up to one class period. Informal CL can be used at the

beginning of a lesson by introducing the resources or setting expectations for the lesson (Heath, 2010). During and/or after the lesson students can work in these informal CL groups to organise, explain and summarise the learning material so that it can be integrated into existing conceptual structures (Gradel & Edson, 2011; Johnson et al., 2013). The tasks given to students must be explicit and the instructions detailed and precise. The groups should be expected to produce a specific product such as a written answer or verbal feedback (Ahmad, 2010). Informal learning groups ensure that students are actively involved in the lesson. It also gives the facilitator the chance to move through the class to observe and listen how well students understand the concepts and material (Johnson et al., 2013). Some of the CL techniques that can be used for informal CL groups are discussed later in this chapter (refer § 2.4.3).

#### **2.4.2.3 *Role of the facilitator in cooperative base groups***

Johnson et al. (2013) define cooperative base groups as long-term, heterogeneous CL groups with stable membership. In these groups students support, help, encourage and assist each other's needs to make academic progress and to develop cognitively and socially in healthy ways. When making use of base groups, the facilitator should divide students into groups of three or four students and make sure the students schedule a time for regular meeting (Onwuegbuzie et al., 2009). The facilitator should create specific agendas with concrete tasks to establish a routine for group meetings (Johnson et al., 2013). The effectiveness of the base groups should be evaluated regularly to ensure the group functions properly (Schul, 2011). According to Johnson et al. (2013), the use of base groups tends to improve attendance, personalise the work required and the school experience, and improve the quality and quantity of learning.

### **2.4.3 Cooperative learning techniques**

Several methods of CL have been developed over the last century. Each method has unique attributes for enhancing student learning. While these cooperative techniques may vary in structure, form and effect, a common thread of enhancing the social development of the individual student runs through them all (Schul, 2011). Some of the more well-known practiced and researched methods are discussed briefly in the following sections.

### **2.4.3.1 Think-pair-share**

Think-pair-share is a CL technique that allows students to engage in individual and small-group thinking before they are asked to answer questions in front of the whole class (Azlina, 2010). The think-pair-share strategy was first developed by Frank T. Lyman in the early 1980s and is arguably the easiest and most used of all CL activities (Schul, 2011). There are three steps to this method. The first step is to provide each individual student something to think about (Schul, 2011). Secondly, individual students are given time to think and then write down their responses (Duckworth, 2010). Thirdly, pairs of students share with their classmates what they learned on their own (Schul, 2011). During this stage a few students can be called on by the facilitator to share their thoughts and ideas with the whole class (Wang, 2009). The think-pair-share technique also enhances students' oral communication skills as they have ample time to discuss their ideas with one another and therefore the responses received are often more intellectually concise since students have had a chance to reflect on their ideas (Azlina, 2010; Schul, 2011).

### **2.4.3.2 Student teams-achievement divisions**

The student teams–achievement divisions (STAD) technique was developed and researched by Robert Slavin in 1986 at the Johns Hopkins University. It focuses on equal opportunities for success and allows students of all ability levels the opportunity to succeed (Duckworth, 2010). STAD uses small heterogeneous groups and consists of five major components: class presentations, teams, quizzes, individual improvement scores and team recognition (Dickinson, 2014). The steps followed are: (a) the facilitator presents material by means of e.g. direct instruction or discussion (Duckworth, 2010); (b) small heterogeneous teams selected according to academic performance meet to study worksheets, discuss problems together, compare answers and correct misconceptions (Wang, 2012); (c) students take individual quizzes and are not allowed to help each other to ensure that every student is responsible for knowing the material (Bawn, 2007); (d) students' individual quiz scores are compared to their past average and they earn points for their teams based on how much their scores could exceed their previous quizzes (Wang, 2012); and (e) the team's effort can be recognised if students' average scores exceed a certain criterion by giving extra rewards (Wang et al., 2012). Although in this method the group score is determined through summation of individual group member scores, students are competing against themselves rather than other students (Duckworth, 2010; Wang, 2012).

### **2.4.3.3 Jigsaw**

The Jigsaw is another well-known CL technique that has been extensively implemented and studied over the years (Aronson, 1978; Duckworth, 2010). Jigsaw refers to the ability to put all the individual puzzle pieces together to see the entire picture (Duckworth, 2010). According to Doymus, Karacop and Simsek (2010), “the jigsaw exists in different versions: (a) Jigsaw I (Aronson, 1978), (b) Jigsaw II (Slavin, 1986), (c) Jigsaw III (Stahl, 1994), (d) Jigsaw IV (Holliday, 1995), (e) Reverse Jigsaw (Hedeen, 2003), and (f) Subjects Jigsaw (Doymus et al., 2007)”. According to Zacharia, Xenofontos and Manoli (2010), the differences among the jigsaw versions concern primarily the way students’ learning is evaluated or the degree of interaction among groups. However, the basic components of all these versions are the same and consist of the following steps:

- Students are assigned to heterogeneous home groups, and the information and academic material is handed to the group (Schul, 2011).
- Each student is given a specific part or subtopic of the information on which they should become the expert (Heath, 2010).
- The experts familiarise themselves with the information and then form new groups consisting of the individuals from the other groups who were granted the same academic material (Azlina, 2010). In these new groups, they discuss and study the information before they return back to their home group to teach the section to their home group members (Schul, 2011).
- Each student undergoes individual assessment on all subtopics (Weidman & Bishop, 2009).

The cooperative goal is that all students know all parts of the educational material, where all of the students must teach and learn (Azlina, 2010).

### **2.4.3.4 Group investigation**

The notion of group investigation, or working cooperatively, was put forth by the Israeli researchers Shlomo Sharan and Yael Sharan (Nam, 2008). Sharan and Sharan (1994) state that group investigation consist of four components: investigation, interaction, interpretation and intrinsic motivation. Investigation refers to the orientation to inquiry, preparing the students to continue through this cooperative process. Interaction accounts for the social aspect of the model where students come together and discuss investigations. Interpretation

occurs both on the individual level and the group level as students seek to make sense of their investigations and observations. The goal, throughout this process, is to develop IM for students to want to find information and understand the concepts under investigation (Sharan & Sharan, 1994; Duckworth, 2010). Group investigation can be implemented by following these main steps (Bawn, 2007; Dickinson, 2014; Schul, 2011):

- Students identify topics and are placed in teams to conduct an investigation.
- Team members decide on subtopics, goals and how topics are to be studied.
- They review, analyse and draw conclusions from information they have gathered.
- Each student has individual responsibilities and the group works together to prepare a final report.
- Group members take turns to present in front of the class by using role plays, panels, simulations or other methods.
- The facilitator and other groups evaluate the report.

While these cooperative techniques may vary in structure, form, and effect, a common thread of enhancing the social development of the individual student runs through them all (Schul, 2011).

#### **2.4.4 Benefits of cooperative learning cooperative learning**

Regardless which of the many successful methods are used, several benefits can be gained from a CL environment. The benefits of CL can be divided into three different categories: intellectual, social and psychological and will subsequently be discussed.

##### **4.4.4.1 Intellectual benefits**

CL produces greater student achievement than traditional teaching/learning methods (Slavin, 1995; Hamm & Adams, 2002; Johnson & Johnson, 2008). It increases the usage of high order thinking skills (Duckworth, 2010; Azlina 2010; Yilmaz, 2011) and promotes critical thinking skills (Heath, 2010; Baghcheghi et al., 2011; Gradel & Edson, 2011). CL involves students actively in the learning process (Moore, 2005; Heath, 2010; Ahmad, 2010; Johnson et al., 2013), it models appropriate student problem solving techniques (Bawn, 2007; Yi &

Luxi, 2012; Dickinson, 2014) and provides an opportunity, especially for students who may not be as advanced, to improve basic educational skills and oral language proficiency (Slavin 1995; Duckworth, 2010). CL can also promote metacognitive skills (Slavin, 1995; Abrami et al., 2011; Nam & Zellner, 2011; Johnson & Johnson, 2009a) and fosters willingness to take on difficult tasks (Johnson & Johnson, 2005; Johnson et al., 2013).

#### **4.4.4.2 Social benefits**

CL provides students with the interpersonal skills necessary for working in groups (Slavin, 1995; Yi & Luxi, 2012; Ozkan, 2006; Gradel & Edson, 2011). It also provides students an opportunity to learn how to understand the perspectives and opinions of other individuals (Tsay & Brady, 2010; Duckworth, 2010; Scheuerell, 2010; Gradel & Edson, 2011). CL has been proven to create an atmosphere of academic achievement and to be effective in classroom environments (Johnson and Johnson, 1993; Johnson and Johnson, 1989; Slavin, 1995; Veenman, Kenter & Post, 2000). It also teaches students to work toward a mutual goal and develop responsibility for each other (Slavin, 1995; Ozkan, 2006; Ning, 2010; Ahmad, 2010). CL promotes IM (Sharan, 2010; Scheuerell, 2010; Johnson et al., 2013; Kao & Lin, 2008) and increases positive heterogeneous relationships among students (Abrami et al., 2011; Yi & Luxi, 2012; Johnson et al., 2013). IT helps to develop a social support system for students (Ning, 2010; Zacharia et al., 2010; Sharan, 2010). Furthermore CL creates an environment where students can practice building leadership skills (Johnson & Johnson, 2005; Ozkan, 2006).

#### **4.4.4.3 Psychological benefits**

CL significantly reduces classroom anxiety (Johnson & Johnson, 2005; Heath, 2010; Abrami et al., 2011). It builds self-esteem in students. They exhibit a feeling of belonging and of being liked by their classmates (El-Anzi, 2005; Killen, 2007; Legum & Hoare, 2004) and it encourages students to seek help and accept tutoring from their peers (Dettori et al., 2006; Bawn, 2007; Zacharia et al., 2010; Johnson & Johnson, 2009). CL also enhances student satisfaction with the learning experience (Onwuegbuzie et al., 2009; Abrami et al., 2011; Heath, 2010; Korkmaz, 2012).

From the section above it is clear that CL holds a large number of benefits when implemented in a learning environment. When implementing CL, the five basic elements of CL should be incorporated into the learning activities. By making use of different CL

techniques it can contribute to enhancing student learning. In the next section motivation, with a specific focus on IM will be discussed.

## **2.5 MOTIVATION**

Motivation is defined as the process by which goal-directed activity is instigated and sustained (Shunck, Meece & Pintrich, 2012). Motivation affects all classroom activities because it can influence the learning of new knowledge and skills and the way in which previously acquired knowledge and skills are executed (Shunck, Meece & Pintrich, 2012). In the following section the theories of motivation, types of motivation and the role of the facilitator to enhance IM will be discussed. The relationship between SDL and motivation, CL and motivation and the implementation on CL to enhance IM will be discussed thereafter. 5

### **2.5.1 Theories of motivation**

The two main historical theories that played a role in motivational research were the behavioural and the cognitive theories (Shunck et al., 2012). However, these two theories fundamentally differ on the basic issue of where motivation occurs. Behavioural theorists view motivation as a change in behaviour (response) as result of an environmental event (stimuli) (DeCharms & Shea, 1976; Lepper & Greene, 1978). They believe that a response to a specific stimulus becomes more likely to occur in the future as a result of a) how often it has been paired with the specific stimuli and b) what happens as result of the pairing of the stimulus and response (Deci & Ryan, 2000; Shunck *et al.*, 2012). Behaviourists believe that when reinforcing consequences, behaviours are more likely to occur in the future whereas when consequences are punished, behaviours are less likely to occur (Skinner, 1953; Kazdin, 2012). Thus from a behavioural point of view, because people are motivated by environmental (extrinsic) events, thoughts and feelings do not need to be included in the explanation of motivation (Shunck et al., 2012).

In contrast, cognitive theorists stress the role of mental structures and the processing of information and beliefs (Choi & Medalia, 2010; Hill, 2011). They believe that motivation is internal and motivation as such cannot be observed directly. However, the product of motivation (behaviours as result of internal motivation) will be visible (White, 1959; Shunck et al., 2012; Zhao & Shen, 2012). From the cognitive theorist point of view, the drive to learn is derived from the satisfaction and pleasure of the activity of learning itself and external rewards are not significant (Deci & Ryan, 2000; Kong et al., 2012).

The conceptualisation of motivation from these two main movements has important educational implications. Behaviourists imply that facilitators should arrange the environment in a way that students can respond properly to a stimulus, while cognitive theorists believe that the facilitator also needs to consider mental processes and not only how the students behave (Shunck et al., 2012). There are a vast number of motivational theories grounded in either behaviourist or cognitive theories. The discussion of some of these motivational theories (§2.3.4) made it evident that there is a positive relationship between CL and motivation. These theories already discussed, namely expectancy-value theory (§2.3.4.1), goal setting theory (§2.3.4.2) and self-determination theory (§2.3.4.3) form the basis of the motivational research in this study.

### **2.5.2 Intrinsic vs extrinsic motivation**

According to Deci and Ryan (2000) to be motivated means to be moved to do something. Thus a person who is not inspired to act is characterised as unmotivated, whereas someone who is eager to attain a certain goal is considered motivated (Deci & Ryan, 2000). Although motivation is sometimes seen as a unitary phenomenon, research suggests that people not only have different levels of motivation but also different types of motivation (Luis et al., 2011). The most basic distinction in motivation is between intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome (Kong et al., 2012).

IM is defined as the motivation to engage in an activity for its “inherent satisfactions rather than for some separable consequences” (Deci & Ryan, 2000). Deci and Ryan (2000) further state that when a person is intrinsically motivated, they act for their own sake because they find working on the task enjoyable. Intrinsically motivated students learn because they are curious about the content and they feel challenged by the learning activity (Leng, Baki & Mahmud, 2010). Working on a task for intrinsic reasons is not only more enjoyable but it also relates positively to learning, achievement and perceptions of competence (Shunck et al., 2012; Luis et al., 2011). According to Shunck et al. (2012), these benefits presumably occur because intrinsically motivated students engage in activities that enhance learning, attend to instruction, rehearse new information, organise knowledge and apply it in different contexts.

An extrinsically motivated individual's actions, on the other hand, are driven by a goal (Hung et al., 2011). The motivation comes from outside a person (external), and it is the incentive for undertaking an action for external reasons or gain (Luis et al., 2011). According to Plotnik and Kouyoumdjian (2013), extrinsic motivation can be beneficial where it induces interest

and participation in something the individual had no initial interest in, or when it motivates people to acquire new skills or knowledge. While it is usually suggested that IM is best, in reality it is not always possible, and extrinsic motivators can be a useful tool to involve students (Plotnik & Kouyoumdjian, 2013).

Since this study focuses on intrinsic motivation, the role of the educator to enhance IM will be discussed in the next section.

### **2.5.3 Role of the facilitator to enhance intrinsic motivation**

Self-determination theory (SDT) (refer § 2.3.4.3) asserts that IM is enhanced when people feel that they have the ability to direct their own behaviours and that they can determine and realise their personal goals, values and interests (Bieg, Backes & Mittag, 2011). In SDT, this ability is referred to as autonomy (Ryan & Deci, 2002). Autonomous students consider their behaviours as an expression of their own free will and they feel a sense of control over the choices they made (Big et al., 2011). Research has explored that autonomy support has an impact on students' intrinsic motivation. A number of areas that facilitators could attend to when planning their learning environments to enhance IM have been identified namely: challenge, curiosity, control and fantasy (Broussard & Garrison, 2004; Moore, 2005; Shunck et al., 2012; Sengodan & Iksan, 2012; Brophy, 2013). The factors that educators should keep in mind when planning their learning environments will be grouped and discussed according to these areas where after a list of guidelines for educators to enhance IM will be compiled.

#### **2.5.3.1 Challenge**

Activities that challenge students' skills tend to be intrinsically motivating (Broussard & Garrison, 2004). According to Shunck et al. (2012), the level of difficulty of such activities should be intermediate to begin with but adjusted upward as students develop skills. Students should be provided with the opportunity for early success and gradually increase the degree of difficulty with the assignments and exams as the semester progresses (Brophy, 2013). This gradual increase raises self-efficacy, which means it gives students a feeling of efficaciousness and accomplishment to begin with and as they become more competent they will also become more confident to set new challenging goals (Shunck et al., 2012; Sengodan & Iksan, 2012).

Setting a goal demonstrates an intention to achieve and activates learning from one day to the next. It directs the student's activities toward the goal and offers an opportunity to

experience success. The key is to strike a balance so that every student feels that they, with reasonable effort, have the capability to succeed while still being challenged to stretch their limits (Sengodan & Iksan, 2012). Facilitators can also help enhancing students' self-efficacy by providing accurate feedback that is specific to the task (Linnenbrink, 2005; Pintrich, Conley & Kempler, 2003). It must also be remembered that the more immediate and comprehensive the facilitator's response to homework and examinations is, the more likely it is to help students reflect not only on their knowledge of the material but also on their learning strategies (Myllymaki & Laboratories, 2012).

### **2.5.3.2 Curiosity**

Curiosity is promoted when students are presented with activities which are built on information or ideas that are different or new to their current knowledge or set of beliefs (Shunck et al., 2012; Tuan, 2011). It motivates students to find out more in order to fill those knowledge gaps (Shunck et al., 2012). When designing coursework, it's important to consider students' interests, background knowledge and abilities because students should believe that the knowledge gap is manageable to fill (Myllymaki & Laboratories, 2012). By connecting the material to real-world experiences or their educational goals, either through examples or in-class activities, their understanding of the material is deepened and students are allowed to see the value of what they are learning (Brophy, 2013).

### **2.5.3.3 Control**

Empowering students and giving them a sense of autonomy and control not only enhances their IM but also help them develop skills for SDL (Shunck et al., 2012; Myllymaki & Laboratories, 2012). Whether it is allowing students to select a research topic or getting their input when designing an evaluative rubric, students' motivation is increased if they feel that they have control of their learning outcomes (Brophy, 2013). To share the classroom control with students means involving them in the process of decision-making, organisation of content and choosing team members (Tuan, 2011). However, when the facilitator shares the classroom control with students, it is of utmost important to provide assistance at appropriate times, as too many choices may lead to increased anxiety and may not have a positive effect on their IM (Shunck et al., 2012).

#### 2.5.3.4 *Fantasy*

IM can be promoted with activities that involve students in fantasy and make-believe through simulations and games of situations that are not actually present (Shunck et al., 2012). When students get to move, engage in a simulation and role-play, conduct an experiment or demonstrate a principle with their bodies, they are actively involved in the classroom (Moore, 2005). Adding a fantasy or fun component will interest students, and when interest is sparked, IM is enhanced (Chiu, Mahat, Hua & Radzuwan, 2013).

Although it is a difficult task for the facilitator to develop student motivation in a learning environment considering that every student learns differently and students are diverse in their own ways, students still expect facilitators to guide and encourage them in a constructive manner (Moore, 2005). If facilitators have a responsibility to motivate students to attend class and to learn, it is important for them to understand specifically how to motivate students (Herman, 2012). From the areas that facilitators could attend to that was discussed above, a list of ten aspects that facilitators could implement in their learning environments to enhance IM was identified and presented in Table 2.1.

**Table 2.1 Aspects to enhance intrinsic motivation**

Number	Aspects to enhance intrinsic motivation	Sources
1	Create activities that challenge students' skills.	Broussard & Garrison, 2004; Sengodan & Iksan, 2012; Brophy, 2013
2	Encourage students to set personally meaningful goals.	Mylymaki & Laboratories, 2012; Brophy, 2013
3	Give rapid and thorough feedback.	Pintrich, Conley & Kempler, 2003; Linnenbrink, 2005
4	Encourage reflection.	Mylymaki & Laboratories, 2012
5	Create opportunities that make a person interested to find out more.	Tuan, 2011; Shunck et al., 2012
6	Make content relevant to real-world experiences.	Shunck et al., 2012; Brophy, 2013

Number	Aspects to enhance intrinsic motivation	Sources
7	Consider students' interests, background knowledge and abilities when designing tasks.	Shunck et al., 2012; Myllymaki & Laboratories, 2012
8	Allow students to make certain choices and take control of the learning situation.	Tuan, 2011; Shunck et al., 2012; Myllymaki & Laboratories, 2012
9	Help students to imagine using the learned information in real-life settings.	Moore, 2005; Shunck et al., 2012; Chiu et al., 2013
10	Make learning fun.	Shunck et al., 2012; Chiu et al., 2013

#### 2.5.4 Self-directed learning and motivation

Motivated students take responsibility for their own learning (Borich, 2007; Loyens et al. 2008; Francom, 2009; Song & Hill, 2007). An approach to education where the student takes responsibility for the learning process is called SDL. As seen in §1.1, SDL allows students to determine their learning goals, select resources to achieve the goals, decide upon their preferred learning strategies and assess the outcomes of the learning process (Knowles, 1975; Ellis, 2007). Ellis (2007) further states that a SDL experience provides several benefits to students, such as: including the potential for increased learning because of an increased responsibility for participating in the learning process; a greater feeling of ownership of the learning process; an expanded ability to use a variety of techniques to achieve learning goals; and an enhanced ability to present ideas in a wider variety of forms. According to Knowles (1975) learning does not take place in isolation but in association with others such as facilitators, tutors and peers. CL is therefore one of the teaching strategies that helps to foster SDL because it contributes to students' academic success, cognitive skills, self-confidence, social skills, metacognition levels, problem solving skills, ability to work in groups, positive attitudes towards learning and internal motivations (refer §1.1). CL has also become one of the mainstream instructions to promote student motivation (McCafferty, 2006).

### **2.5.5 Cooperative learning and motivation**

By adopting a CL approach, facilitators encourage students to become actively involved in the learning process (Heath, 2010; Brophy, 2013). A number of researchers have found that as students become more engaged in their learning, their motivation increases (Jones & Issroff, 2005; Johnson, Johnson, & Smith, 2007; Hew & Cheung, 2008; Kumaran, 2009; Yersilyurt, 2009; Sharan, 2010; Nam & Zellner, 2011). To motivate students to learn, facilitators need to create sufficient opportunities for students to interact with their peers and provide them with learning support (Ning, 2010; Zacharia et al., 2010; Sharan, 2010). According to Slavin (1995), CL ultimately results in better learning because the process of cooperation prompts motivation and consequential cognitive activities. He further states that when students have the motivation to learn, encourage and help one another, a stage is created for cognitive development. CL has become one of the mainstream instructions to promote student motivation and student-student interaction (McCafferty, 2006). In a study done by Wang (2012), it was found that by using CL techniques, students' motivation improved. He proposed the following reasons for his findings which were supported by a number of other CL researchers:

#### ***Increase self-efficacy***

The perception of self-efficacy is a central constituent of intrinsic motivation (IM) and a strong predictor of high levels of motivation in educational settings (Choi & Medalia, 2010). According to Bandura (1991) self-efficacy plays a central role in the exercise of personal agency. He argues that people's beliefs in their efficacy influence amongst other things the choices they make, their aspirations and how much effort they put into a specific task (Bandura, 1991). Bandura (2001) further states that self-beliefs of efficacy also affect the goal-setting sub-function of self-direction. According to motivational theories, motivation is affected by how people attribute their past success or failure (Weiner, 2007; Wang 2012). If individuals believe that they reached a certain competence level, they focus on personal improvement and maintain strong commitment to goals (Wang 2012). Highly self-efficacious students pursue more than students with low self-efficacy, spend more time on their learning process and become more successful (Tuan et al., 2011). Bandura (1991) also states that people who regard themselves as highly efficacious tend to ascribe their failures to insufficient effort, whereas those who regard themselves as inefficacious view the cause of their failures as stemming from low ability. Students' beliefs in their efficacy to regulate their own learning and to master academic activities determine their aspirations, level of motivation, and academic accomplishments (Bandura, 1993).

### ***Experience success***

Based on the motivation theories, students must have a sense of control over learning tasks to enhance motivation (Wang 2012). Allowing students to improve on their own past performance rather than against their classmates is a way of doing so (Deci & Ryan, 2000; Wang, 2012). In CL, this pedagogical practice is called “equal opportunities for success” (Slavin, 1983; Walsh, 2011), a feature shared by many CL methods and link closely with positive interdependence and promotive interaction that should be part of every CL environment.

### ***Setting a group goal***

Motivationalists believe that human behaviour is regulated by goals and that the setting of personal goals is in turn influenced by factors such as group goals, role modelling, encouragement and feedback (Lock & Latham, 1990; Wang, 2012). These factors are compatible with Slavin’s (1995) CL research that the setting of group goals will trigger motivation to learn, motivation to encourage group members to learn, and motivation to help group members to learn. Students’ achievement motivation is often higher in small-group activities because students feel more positive about being able to complete a task with others than about working individually (Johnson et al. 1991; Wang, 2012). This closely relates to positive goal interdependence in a CL environment.

### ***A positive relationship with classmates***

When learning in a cooperative group setting, students develop a positive interdependence towards their classmates, which increases motivation (Kraus, Stark & Mandl; 2009; Wang, 2012). A CL environment promotes behaviours such as working hard, attending class, participating in activities, acknowledging others’ efforts and opinions, and receiving help from others (Wang, 2012). Through mutual feedback and debate, peers motivate one another to abandon misconceptions and search for better solutions (Slavin, 1995). When success is based on the group’s efforts rather than individual work, students attribute success to hard work rather than luck, and they are motivated to give their best (Nam & Zeller, 2011; Wang, 2012). It also relates to the interpersonal and social skills element of CL as identified by Johnson and Johnson (1994).

It is evident that the implementation of CL in the classroom fosters and promotes student motivation. Although in this discussion motivation was viewed as a unitary phenomenon, motivationalists distinguish between two types of motivation: intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable and extrinsic motivation,

which refers to doing something because it leads to a separable outcome (Deci & Ryan, 2000). For the purpose of this study the researcher will focus on IM in the next section.

## **2.5.6 Implementing cooperative learning to enhance intrinsic motivation.**

It is evident from this chapter that the implementation of CL is a challenging goal for educators. It requires a commitment to change and the willingness to take risk; it takes time and requires planning. From the literature study on CL and with use of the ten aspects that facilitators could implement in their learning environments to enhance IM (Table 2.1), a set of guidelines for implementing CL to enhance IM is proposed and will be discussed in the section below.

### ***2.5.6.1 Specify and define the outcome and purpose of the learning task***

The decision to include CL assignments in a course should be based on a careful examination of course goals (Abrami et al., 2011). For example, if students are expected to be able to apply theoretical knowledge to real-world problems, or demonstrate decision-making or problem-solving skills, then it may be appropriate to include CL in the design of the course (Ding et al., 2010; Gradel & Edson, 2011). It is best not to think of CL as something added on to an existing course structure, but instead as something that helps shape the design of the syllabus and helps synthesise specific course objectives (Sharan, 2010). When planning a CL learning task, learning goals should be explicitly defined by either the facilitator or the group (Johnson & Johnson, 2012). The learning goals should be specific, clear, realistic and achievable (Abrami et al., 2011; Gradel & Edson, 2011; Johnson et al., 2013). Define the overall purpose of the learning task and establish where the group experience fits in to ensure it is meaningful and not just an add-on (Gradel & Edson, 2011). When setting explicit goals and defining the learning task, it helps to establish positive goal interdependence (refer §2.5.1.1). As seen in §2.5.3.1, students' activities that are directed toward a specific goal offers them an opportunity for to experience success, which will help to enhance their self-efficacy and give them a feeling of efficaciousness and accomplishment (refer §2.5.3.1). When their competency levels are raised, they will also become more confident and motivated to set new challenging goals (Shunck et al., 2012; Sengodan & Iksan, 2012).

### **2.5.6.2 Choose an effective task structure**

When planning the CL task, there is a few administrative aspects to keep in mind, namely: a) the size and membership structure of the groups; (b) time allocated for activities; (c) layout or arrangement of learning space; (d) different roles for group members; and (e) relevant resources including their distribution and accessibility (Johnson & Johnson, 2008; Duckworth, 2010; Denton, 2011; Schul, 2011). These pre-instructional decisions (see §2.5.2) should be made and finalised beforehand for the CL session to proceed smoothly. When designing the CL task, it is also important to consider using different learning techniques (see §2.5.4), use real world problems, and focus on enhancing problem-solving and critical thinking skills (Mundy, 2011; Zacharia et al., 2010). As seen in §2.5.3.2, by connecting the material to real-world experiences the facilitator will deepen the students' understanding of the material and allow them to see the value of what they are learning (Brophy, 2013). It also motivates students to find out more to fill their knowledge gaps (see §2.5.3.2).

### **2.5.6.3 Reinforce the process skills to be performed**

It is important that the facilitator take time before or during the CL session to teach students some of the process skills needed to successfully complete the task. Students need to be familiarised with processes such as: (a) what are the responsibilities of the different roles; (b) how to set personal goals; (c) how to write reflections; and (d) how to resolve conflict in the group (Nam, 2008; Ding et al., 2010; Duckworth, 2010; Johnson et al., 2013). The facilitator should provide opportunity and encourage promotive interaction (refer §2.5.2.3) as well as the appropriate use of social skill (refer §2.5.2.4). Through this interaction students become more motivated because they learn social affective strategies, and their sense of competence are increased through the process of sharing opinions (Herman, 2011). Students' motivation will also be promoted when they are involved in the process of decision-making, organisation of content (Tuan, 2011). The choosing of team members, establishing greater ownership of their learning and a stronger sense of personal purpose in learning (refer §2.5.2.3) also helps to promote the students' motivation.

### **2.5.6.4 Select the assessment approach best fit for the learning task**

There are a number of ways in which CL tasks can be assessed. The facilitator can either choose one assessment strategy or use a combination of strategies. In some cases each student will be individually assessed for a specific task or section of the work (Tsay & Brady, 2010), which promotes individual accountability (refer §2.5.1.2). Students can also be assessed on how well they functioned within the group (Johnson & Johnson, 2009), which

also refers to group processing (§2.5.1.5). Most of the CL techniques suggest a form of assessment that compliments the specific technique (refer §2.5.3). As long as the students know exactly what is expected of them, and it complements the learning task, the facilitator can use any assessment strategy (Ning, 2010). Allowing students to partake in assessment and to create class materials can also serve as other tactics for supporting students' autonomy (refer §2.5.2.3) especially in contexts where students help generate new class content (Herman, 2012).

#### **2.5.6.5 *Provide good direction***

Students should know exactly what is expected of them. The facilitator should spend some time to explain the task and make sure the students understand it before they start (Refer §2.5.2.1). When explaining the task, the facilitator should focus on the different roles of the group members, learning goals, assessment criteria and class rules (Ning, 2010; Abrami et al., 2011; Gradel & Edson, 2011). The facilitator should ensure every student is on board, understand their way forward and is excited about the task before starting.

#### **2.5.6.6 *Be visible, evaluate performance and provide feedback***

CL is a student-centred teaching strategy. Thus the role of the educator will change to that of a facilitator (Johnson et al., 2013). The facilitator should avoid the temptation to lead the group and only act as a mediator of thinking to steer the students in the right direction (Sharan, 2010). The facilitator should move around and observe how the groups and individuals are functioning, only intervening to assist students when necessary (Johnson et al., 2013; Yi & Luxi, 2012). The visibility of the facilitator also promotes individual accountability (refer § 2.4.2). The facilitator can interrupt group discussions to introduce new ideas, and to clarify a task or concepts (Johnson et al., 2013; Parolia et al., 2011). It is important to give not only regular informal feedback throughout the session, but also more structured feedback at the end of a CL session. This structured feedback should be task-specific, conclude what has been done and explain the way forward (Linnenbrink, 2003; Pintrich et al., 2003). The facilitator should encourage students and help them to give regular feedback to their group members and encourage each other (Wang, 2012), assisting them in the appropriate use of social skills (refer §2.5.1.4).

### ***2.5.6.7 Reflect on the activity***

It is important that there is some form of reflection after the completion of the CL task. Students should reflect on how well they worked together and on the extent to which the learning goal was reached §2.5.2.5). Through this reflection, students can get feedback to consider and use to improve (Yi & Luxi, 2012). This reflection exercise also gives them the opportunity to complement each other for their contributions. The students should not only reflect on their own learning and the working of the group but also on the CL task in general (Moore, 2005), which will guide the facilitator in planning the next task.

In Table 2.2. A summary of guidelines discussed above and their corresponding IM aspect will be given. While chapter 3 focuses on the implementation of CL in a BL environment, the list of guidelines in Table 2.2 can be used for any learning environment.

**Table 2.2 Guidelines for implementing cooperative learning to enhance intrinsic motivation**

Number	Guideline	Sources	Corresponding guideline for intrinsic motivation (see Table 2.1)
1	Specify and define the outcome and purpose of the learning task.	Ding et al., 2010; Abrami et al., 2011; Gradel & Edson, 2011; Johnson & Johnson, 2012	1, 5 and 7
2	Choose an effective task structure.	Johnson & Johnson, 2008; Duckworth, 2010; Denton, 2011; Schul, 2011; Mundy, 2011; Zacharia et al., 2010	1, 5, 6, 7, 9 and 10
3	Reinforce the process skills to be performed.	Nam, 2008; Ding et al., 2010; Duckworth, 2010; Johnson et al., 2013	2, 8, 9 and 10
4	Select the assessment approach best fit for the learning task.	Tsay & Brady, 2010; Johnson & Johnson, 2009a; Ning, 2010	4, 6, 8 and 9
5	Provide good direction support and guidance.	Ning, 2010; Abrami et al., 2011; Gradel & Edson, 2011	2 and 10
6	Be visible, evaluate performance and provide feedback.	Johnson et al., 2013; Sharan, 2010; Johnson et al., 2013; Yi & Luxi, 2012; Parolia et al., 2011; Linnenbrink, 2003; Pintrich et al., 2003; Wang, 2012	3, 4 and 9
7	Reflect on the activity.	Yi & Luxi, 2012; Moore, 2005	4 and 9

## **2.6 SUMMARY**

CL is a complex concept with a number of aspects to keep in consideration when implementing it in a classroom. This chapter highlighted what CL is, where it came from, how it evolved, what its benefits are and what the role of the facilitator is to implement it. Firstly, a history of CL was given and the underlying educational theories that influenced CL were discussed. This included the a) social interdependence theory; (b) cognitive-developmental theory, (c) the behavioural learning theory and d) motivational theories. There after the essence of CL was discussed in terms of the five basic elements of CL, the role of the educator in a formal CL, informal CL and CL base groups. A number of the most popular CL techniques were discussed and the benefits of CL were listed. The researcher then gave a brief review of the relationship between CL and motivation. This was discussed with a focus on enhancing IM by means of CL. While this chapter discussed CL without taking a specific learning environment in mind, chapter 3 will focus on the implementation of CL in a blended learning (BL) environment specifically.

## **CHAPTER 3**

# **COOPERATIVE LEARNING IN A BLENDED LEARNING ENVIRONMENT**

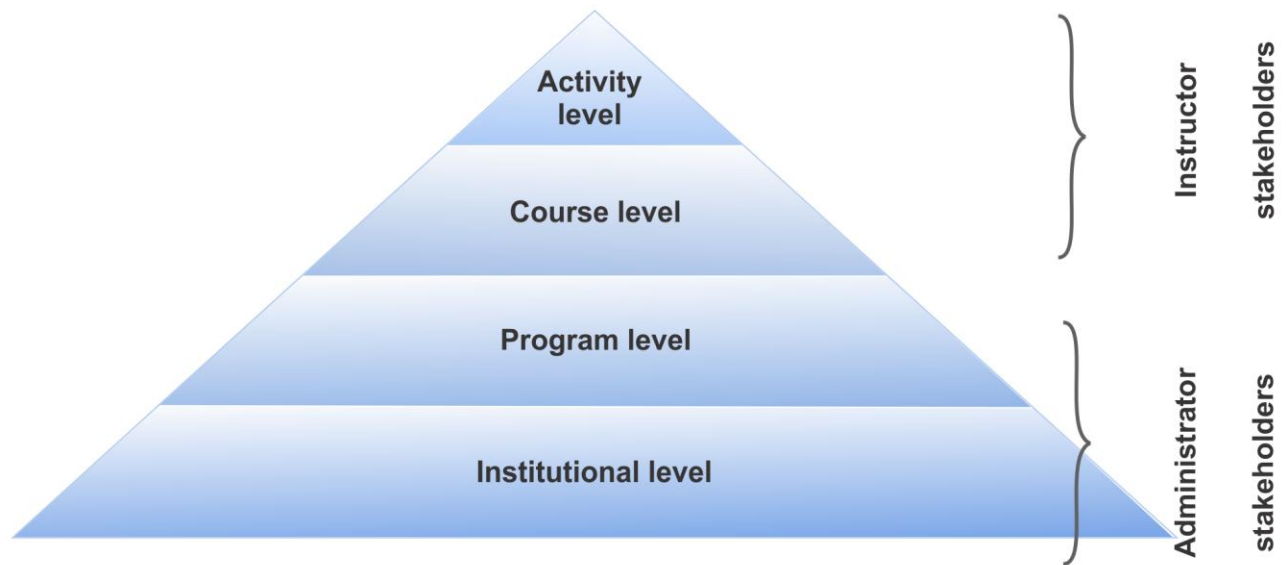
### **3.1 INTRODUCTION**

In Chapter 2, sub-aim (i) was investigated. It dealt with aspects such as the history, underlying theories and basic elements of cooperative learning (CL). The role of the facilitator, CL techniques and benefits were also discussed as well as the implementation of CL to improve intrinsic motivation (IM) (§2.5.5). Chapter 2 did not focus on CL in a specific learning environment but for learning environments in general. As stated in sub-aim (ii), this study investigates how CL strategies can be adopted for a blended learning (BL) environment (§1.3). The purpose of this chapter is to achieve sub-aim (ii). The following will be discussed regarding the implementation of CL in a BL environment: definition of BL (§3.2); classification of BL (§3.3); BL models (§3.4); synthesis of models for developing BL programmes (§3.4.5); the benefits (§3.5) and challenges of BL (§3.6); and finally the implementation of CL in a BL environment to enhance IM (§3.7).

### **3.2 DEFINITION OF BLENDED LEARNING**

The concept of BL is being embraced internationally; however, a generally acceptable common definition has not yet emerged. According to Graham (2009), blending can occur at many different levels (Figure 3.1) and the stakeholders will differ for each level. BL on the institutional and programme level have administrative stakeholders that are interested in issues such as cost effectiveness and expanding the access of learning to other audiences (Bliuc, Goodyear & Ellis, 2007; Al-Busaidi, & Al-Shihi, 2011; López-Pérez et al. 2011). BL at the course and activity levels have instructor stakeholders who are primarily interested in issues of learning effectiveness, productivity, and teaching and learning strategies (Delialioğlu, 2012; Garrison & Vaughan, 2013; Geçer, 2013). For the purpose of this study, literature that focusses on BL at course and activity level for the implementation of BL in the classroom will be reviewed.

There are numerous definitions of BL. Graham, Allen and Ure (2003) synthesized these definitions into three categories: (1) instructional modalities, (2) instructional methods, and (3) face-to-face instruction and computer-mediated instruction.



**Figure 3.1 Different levels on which blending can occur (Graham, 2009:376)**

The first category defines BL as a combination of different modes or delivery media. Examples of definitions in the instructional modalities category are:

- “a learning program where more than one delivery mode is being used with the objective of optimizing the learning outcome” (Singh & Reed, 2001:1).
- “to combine or mix modes of Web-based technology (e.g., live virtual classroom, self-paced instruction, collaborative learning, streaming video, audio, and text) to accomplish an educational goal” (Driscoll, 2002:24).
- “the combination of a wide range of learning media (instructor lead, web based courseware, simulations, job aids, webinars, documents) into a total training program” (Bersin, 2004:15).

The instructional methods category defines BL as a combination of different instructional methods or strategies: Examples of the definitions in this category are:

- “the use of two or more distinct methods of training. This may include combinations such as: blending classroom instruction with online instruction, blending online instruction with

access to a coach or faculty member, blending simulations with structured courses, blending on-the-job training with brownbag informal sessions, blending managerial coaching with e-learning activities“ (Clark, Mayer & Thalheimer, 2003:4). Examples of the definitions in this category are:

- “the use of two or more distinct methods of training” (Rossetti, 2002:6).
- “any combination of different methods of learning, different learning environments, different learning styles” (Marsh, 2012:9).

According to Bonk and Graham (2006), the problem with both these categories is that they are too broad and can be used to describe almost any instructional environment. Thus, a definition for BL only focusing on these aspects will not capture its essence.

The third category reflects the most common idea of BL and defines BL as some form of combination of face-to-face instruction and technology-mediated instruction (Garrison & Kanuka, 2004; Graham, 2009; Allen & Seaman, 2010; Sahare & Thampi, 2010).

- “the combination of face-to-face instruction with computer-mediated instruction” (Graham, 2006:5).
- “a course that blends online and face-to-face delivery” (Allen & Seaman, 2010:5).
- “the combination of face-to-face classroom instruction with computer mediated instruction in an online environment which results in the reduced classroom contact hours or seat time” (Sahare & Thampi, 2010:3).

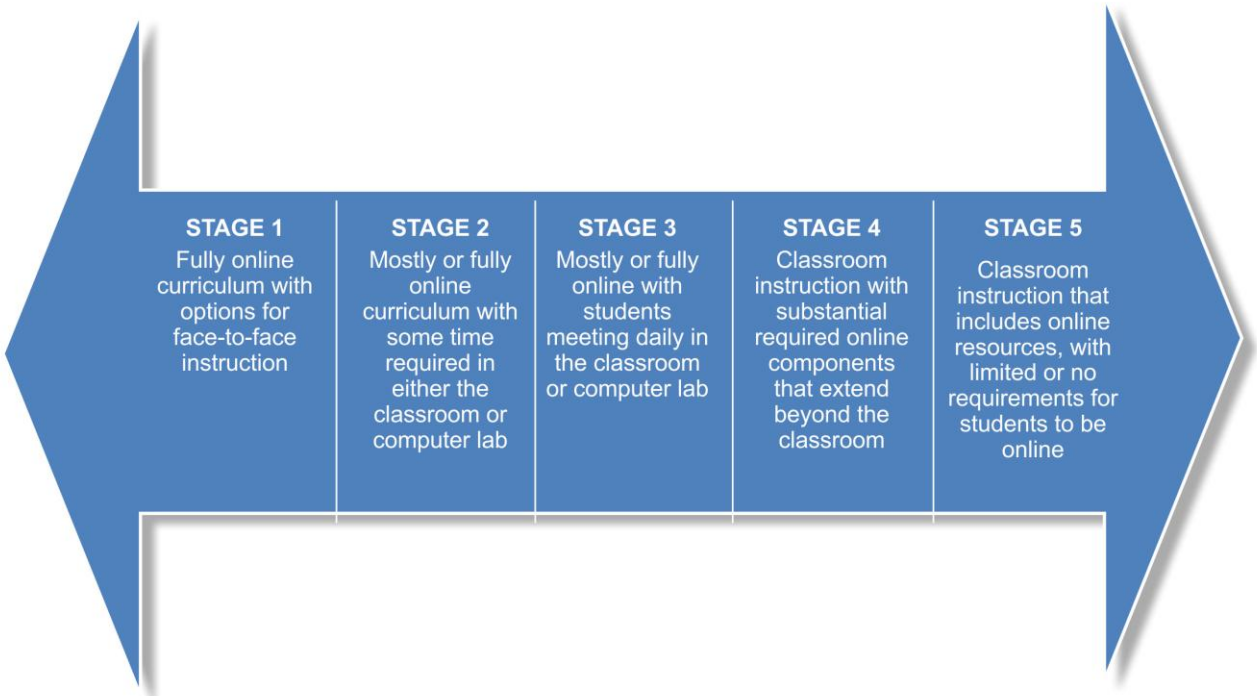
These definitions reflect the idea that BL is the combination of two different models of teaching and learning, namely the traditional face-to-face learning and online learning, each with their own historical background, learning strategies, strengths and weaknesses (Bonk & Graham, 2006). Therefore, the basic principle is that face-to-face and online learning should be optimally integrated in such a way that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose (Garrison & Vaughan, 2008). However, BL is not merely the integration of technology in the classroom or identifying the right blend of technologies to increase student access to learning opportunities. It requires the facilitator to create a

transformative environment where critical and complex learning skills could be developed (Garrison & Kanuka, 2004). Thus, in a BL environment, the use of technology transitions from a great teaching tool to the actual learning space where the collaboration and sharing occurs (Delialioğlu, 2012; Cooke, 2013). The component of collaboration and the shift from a teacher-centred to a student-centred interaction is central to BL (Risner, 2011, McDonald, 2012). For the purpose of this study, the collaborative component of BL will be attended to in a CL environment and the elements of CL will be taken into consideration throughout the study.

There are many reasons why a blended approach to learning might be selected. BL can increase access and flexibility for students, increase level of active learning, and achieve better student experiences and outcomes (Saliba, Rankine & Cortez. 2013). In the next section some models for BL will be discussed.

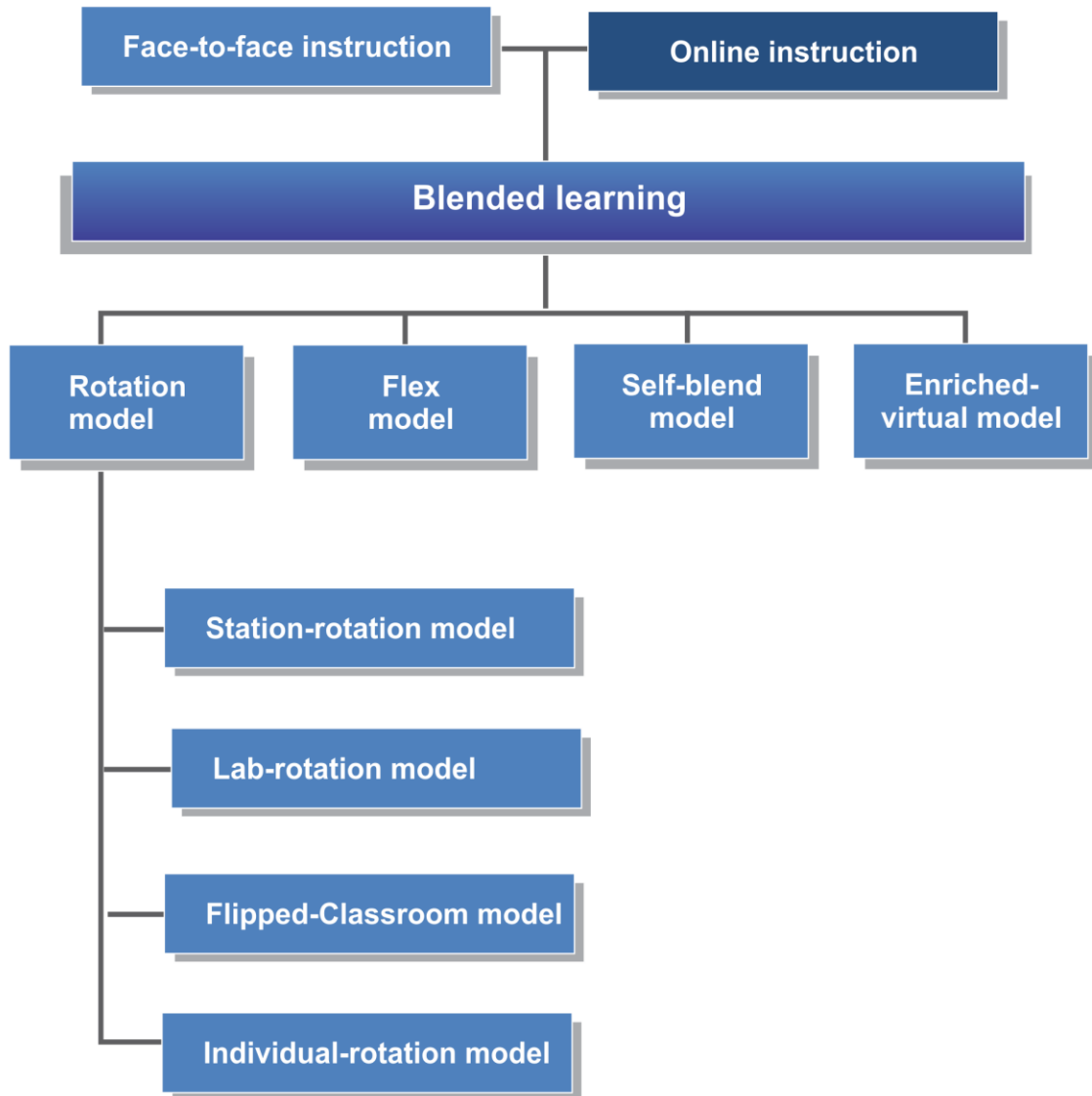
### **3.3 CLASSIFICATION OF BLENDED LEARNING**

BL comes in many shapes and sizes. In one course, an instructor may assign weekly self-paced online activities to a group of students and also meet in-person for some discussion sessions. Another BL course might be fully online and only blend a range of online reading materials, self-paced tutorials and podcasts, allowing students to choose the resources or learning materials that best meet their learning style. The International Association for K-12 online learning summarises BL in a continuum, giving facilitators an idea of the many ways in which online learning can be blended with face-to-face instruction (see Figure 3.2).



**Figure 3.2 Blended-learning continuum (Eduview, 2009:3)**

Staker and Horn (2012) wrote a report that categorises four possible combinations of different models of BL (see Figure 3.3). These models can all be positioned somewhere on the BL continuum.



**Figure 3.3 Staker and Horn’s blended learning taxonomy (Staker & Horn, 2012:2)**

### **3.3.1 Rotation model**

The rotation model is designed for a module or programme where students rotate between face-to-face and online instruction (Staker & Horn, 2012). Different types of rotation models can be distinguished, namely, station rotation, laboratory rotation, flipped classroom and individual rotation.

### **Station rotation**

According to Staker and Horn (2012), in the station rotation model students are expected to rotate between classroom-based learning stations. These stations consist of activities such as group projects, individual tutoring, and pencil-and-paper assignments, but the rotation have to include at least one station for online learning. The rotation occurs on a fixed schedule or at the facilitator's discretion (Staker & Horn, 2012).

### **Lab rotation**

In the lab rotation model, students also rotate according to a fixed schedule or at the lecturer's discretion between learning spaces (Staker & Horn, 2012). However, according to Staker and Horn, (2012) these learning spaces are not classroom-based as with the station rotation model; they are based in different locations across the campus. At least one of these spaces is a learning laboratory for predominantly online learning, while the additional classrooms house other learning activities.

### **Flipped classroom**

The flipped classroom model enables students to rotate on a fixed schedule between guided face-to-face practice and projects in the classroom or on campus, while the online component can be accessed from a remote location (home) on their own time and pace (Staker & Horn, 2012). The primary delivery of content and instruction in the flipped classroom is online, and it allows lecturers to spend more time interacting directly with students instead of lecturing during class time (Staker & Horn, 2012). Class time can now be allocated for students to ask questions and test their skills by applying knowledge and interact with one another in hands-on activities (Tucker, 2012).

### **Individual rotation**

The individual rotation model also expects students to rotate between learning environments, of which at least one is online learning (Staker & Horn, 2012). However, each student has an individually customised, fixed schedule. This rotation model differs from other rotation models because students do not necessarily rotate to each available station of modality (Staker & Horn, 2012).

### **3.3.2 Flex model**

According to Staker and Horn (2012), the flex model can support a programme in which content and instruction are primarily online. Students move on an individually customized, fluid schedule between learning stations while the facilitator remains on campus. The facilitator provides face-to-face support on a flexible, adaptive, as-needed basis through activities such as small-group instruction, group projects and individual tutoring (Staker & Horn, 2012).

### **3.3.3 Self-blend model**

Staker and Horn (2012) states that the self-blend model refers to a situation where students choose to take one or more courses entirely online to supplement their traditional courses. Thus, students self-blend between some individual online courses and take other courses at a campus with face-to-face teachers (Staker & Horn, 2012).

### **3.3.4 Enriched virtual model**

With this model, students divide their time for a specific module between attending on-campus classes and remote learning, using online delivery of content and instruction (Staker & Horn, 2012). Thus students do not have to attend classes on campus every day of the week. In the following section, a number of models for the development of BL environments will be discussed.

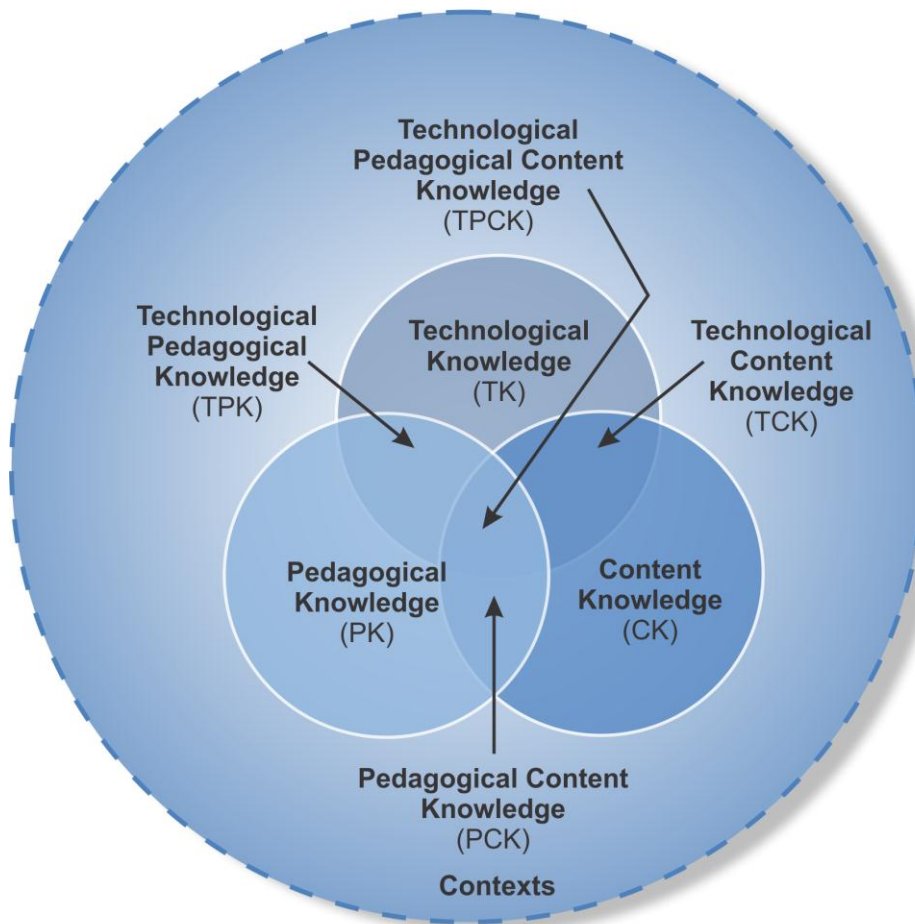
## **3.4 DEVELOPMENT OF BLENDED LEARNING ENVIRONMENTS**

When redesigning courses, facilitators should ask themselves where on the BL continuum they want their module to be and what models they will follow to implement BL. The rotation models and the enriched virtual model will be the most appropriate models in the context of this study because facilitators will be able to integrate CL techniques (refer §2.4.3) in any one of these models.

In BL environments, face-to-face and online learning should be optimally integrated in such a way that the strengths of each are blended together (refer §3.2). At the North-West University, the site for this study, the traditional mode of delivery has always been face-to-face. When moving towards BL from this context, lecturers should start to integrate technology in their classrooms. To inform good practice in BL, it is important to review a number of pedagogical models which focuses specifically on the integration of technology. In the following section a few models that aim to provide guides and tools for facilitators developing BL programmes will be discussed.

### 3.4.1 Mishra and Khoeler's TPCK model

Mishra and Khoeler (2006) suggested a conceptual framework (see Figure 3.4) for educational technology called the technological pedagogical content knowledge (TPCK) model. The TPCK model attempts to integrate three main components of learning environments namely: content (C), pedagogy (P) and technology (T). They accentuate the connections, interactions, affordances and constraints among these concepts. In this model, knowledge about content (C), pedagogy (P) and technology (T) is central for developing good teaching.



**Figure 3.4** Mishra and Khoeler's TPCK model (Mishra & Khoeler, 2006:1025)

**Content knowledge (CK)** is knowledge about the actual subject matter that is to be learnt or taught (Mishra & Khoeler). Facilitators must know and understand the subjects that they teach, including knowledge of central facts, concepts, theories, and procedures within a given field, knowledge of

explanatory frameworks that organise and connect ideas, and knowledge of the rules of evidence and proof (Ball, Thames & Phelps, 2008).

**Pedagogical knowledge** (PK), according to Mishra and Khoeler (2006), is deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values and aims. PK is a generic form of knowledge that is involved in all issues of student learning, classroom management, lesson plan development and implementation, and student evaluation. PK includes knowledge about techniques or methods to be used in the classroom, the nature of the target audience and strategies for evaluating student understanding (Wong, Chong, Choy, Wong & Goh, 2008). PK requires an understanding of cognitive, social and developmental theories of learning and how they apply to students in their classroom because facilitators with deep pedagogical knowledge are expected to know how students construct knowledge, acquire skills, and develop habits of mind and positive dispositions toward learning (Mishra & Khoeler, 2006).

**Pedagogical content knowledge** (PCK) refers to knowledge of pedagogy that is applicable to the teaching of specific content. According to Mishra and Khoeler (2006), this knowledge includes knowing what teaching approaches fit the content and knowing how elements of the content can be arranged for better teaching. This knowledge is different from the knowledge of a subject expert and also from the general pedagogical knowledge shared by instructors across disciplines. According to Abell (2008), PCK is concerned with the representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of students' prior knowledge and theories of epistemology. It further involves knowledge of teaching strategies that incorporate appropriate conceptual representations in order to address student difficulties and misconceptions, and that foster meaningful understanding (Abell, 2008).

**Technology knowledge** (TK) is defined by Mishra and Khoeler (2006) as knowledge about standard technologies such as books, chalk and blackboard and more advanced technologies such as the Internet and digital video. TK includes knowledge of how to install and remove peripheral devices, install and remove software programs, and create and archive documents (Roblyer, 2006:6-8). Since technology is continually changing, the nature of TK also needs to shift with time, and facilitators need to stay informed. The ability to learn and adapt to new technologies, irrespective of what the specific technologies are, is of the utmost importance (Mishra & Khoeler, 2006:1028).

**Technological content knowledge (TCK)** is knowledge about the manner in which technology and content are reciprocally related (Mishra & Khoeler, 2006). Because there is a wide variety of educational software packages available, the facilitator does not need to have the knowledge to create these programs, but it is important to be informed about what is available and how to use that effectively (Roblyer, 2006).

**Technological pedagogical knowledge (TPK)** is not only the knowledge of the existence, components and capabilities of various technologies, but also the knowledge of how those technologies can be used in teaching and learning settings, and conversely knowing how teaching might change as the result of using particular technologies (Mishra and Khoeler, 2006). They further believe that TPK might include an understanding that there are a variety of tools for a particular task as well as the ability to choose a tool based on its appropriateness. It also encompasses strategies for using the tool's affordances, knowledge of pedagogical strategies and the ability to apply those strategies for technology integration.

**Technological pedagogical content knowledge (TPCK)** is a much broader form of knowledge that goes beyond all three components mentioned above (content, pedagogy, and technology). According to Mishra and Khoeler (2006), this knowledge is different from the general pedagogical knowledge shared by instructors across disciplines and also from knowledge of a disciplinary or technology expert. TPCK is the basis of good teaching using technology and requires the following (Mishra and Khoeler, 2006):

- an understanding of the representation of concepts using technologies
- pedagogical techniques that use technologies in constructive ways to teach content
- knowledge of what makes concepts difficult or easy to learn and how technology can help redress
- an understanding of some of the problems that students face
- knowledge of students' prior knowledge and theories of epistemology
- knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones

As part of their model for technology integration in teaching and learning, Mishra and Khoeler (2006) argue that developing good content requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy and content. The core of their argument is that there is no single technological solution that is generic for every facilitator, every student, every course or every teaching perspective. Developing a deeper understanding of the complex relationships between these sources of knowledge and using this understanding to develop appropriate, context-specific strategies and representations are required for quality teaching.

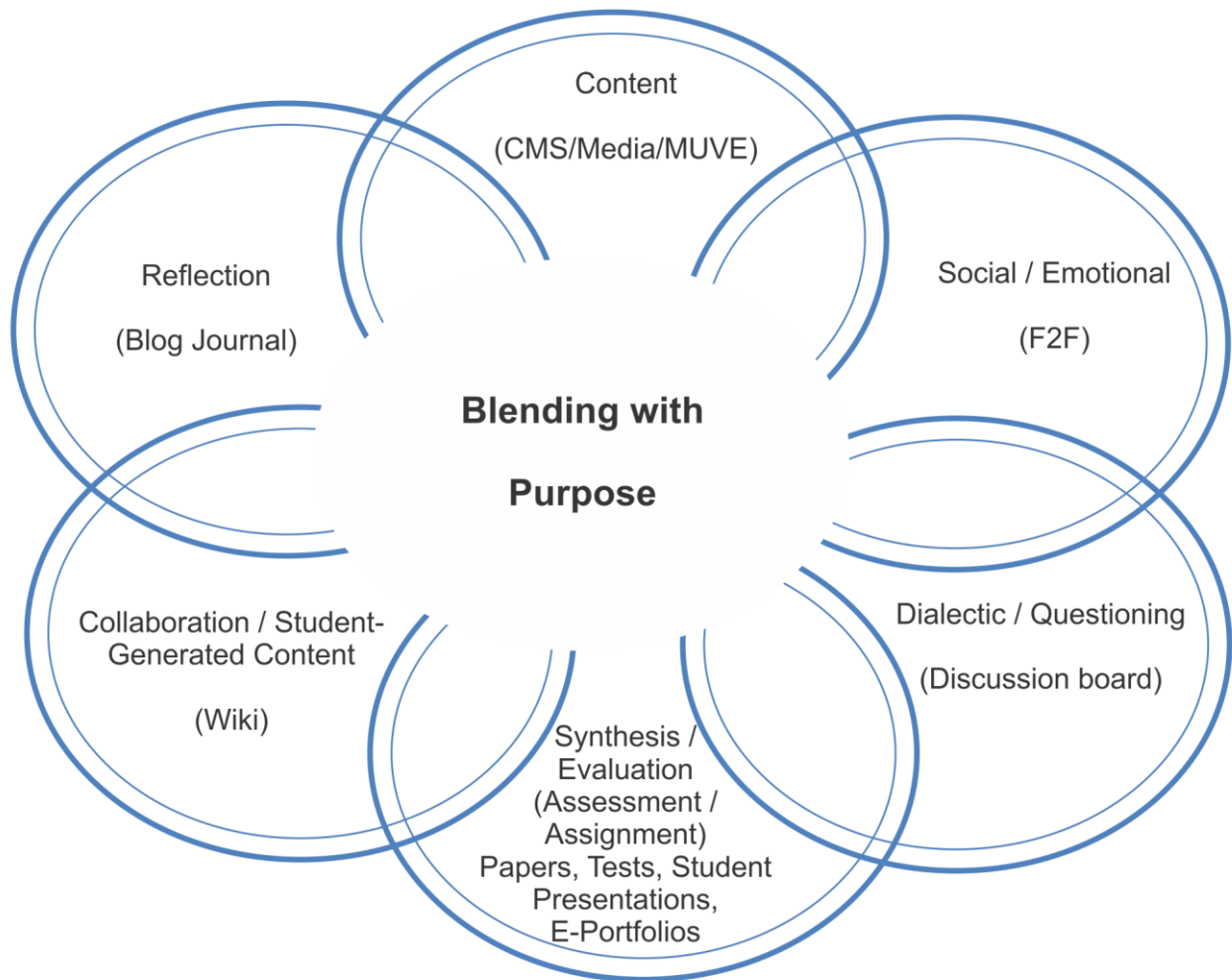
### **3.4.2 Picciano's multimodal conceptual model**

Picciano (2009) proposed a multimodal conceptual model designed to meet the needs of a variety of students. His approach focused on the fact that students represent different generations, personality types and learning styles and suggested that facilitators and instructional designers use a range of modalities to meet this wide range of needs. This model presents suitable methods for achieving six basic pedagogical objectives and activities (Figure 3.5). According to Picciano (2009), instructors need to carefully consider their objectives and understand how to apply the chosen technologies and approaches.

The six components of this model should blend together in an integrated manner that appears as seamless as possible for students (Picciano, 2009). Picciano holds that it is not necessary to incorporate all the components of the model into every BL classroom. The pedagogical objectives of a course should drive the activities and determine which components of the model best fit which courses to cohesively serve overall programmatic goals and objectives.

**Content** can be delivered and presented in a number of ways and, according to Picciano (2009), it is one of the primary drivers of instruction. Although most of what is taught in traditional teacher-centred classrooms is delivered by “teacher speaks – student listens” or “teacher writes – student writes”, it does not have to be the case in face-to-face or online environments. Picciano suggests that multiple technologies and media be exploited by means of multi-user virtual environments (MUVEs) and course management systems (CMSs) that support a variety of media including text, video, and audio. According to Kaur (2013), some instructional media may be more appropriate than others in supporting a specific goal, task or outcome, but no single medium is inherently better or worse than any other if selected carefully. Brown, Adler, Worthman, Copeland, Costello and Angold (2008) contend that students want to discover and create new information and then reveal it to others. The available online technologies can help balance the power in the classroom towards

the students so that they no longer have to passively consume or browse through available content (Bonk & Khoo, 2014).



**Figure 3.5 Blending with purpose: the multimodal model (Picciano, 2009:11)**

**Social and emotional** support of students is just as important as the learning of content in a learning environment (Picciano, 2009). Picciano (2009) believes that although fully online courses and programmes have evolved to the point where faculty can provide some support, in blended courses and programmes this might best be provided in a face-to-face mode. However, according to Marsh (2012), the use of student blogs and student progress reporting available with many learning management systems provides the facilitator with a good overview of who is falling behind or feeling isolated. It also offers the opportunity to provide support on these levels without drawing

attention to it in class, particularly with quieter students who often get overlooked in the busy classroom.

**Dialectics or questioning** is an important activity that allows faculty to find out what students know. When facilitators ask the right questions, it can stimulate discussion and help students to think critically about certain aspects which will help refine their knowledge (Picciano, 2009). Picciano (2009) suggests that a well-organised discussion board activity can be meaningful for students to respond to questions and to share their own perspectives, while evaluating and responding to the opinions of others. According to Holley and Oliver (2010), discussion board activities help students to reflect on their own ideas. They believe that the use of online discussion helps students to think through their own opinions, and it seems less threatening than speaking out in class (Holley & Oliver, 2010).

**Reflection** is a powerful pedagogical strategy that requires students to reflect on their learning and to share reflections with their facilitators and fellow students (Picciano, 2009). Blogs, whether as group exercises or for individual journaling activities, can be appropriate tools for students to reflect on their learning and other aspects of course activities. Reflection as a group activity allows students to compare their work with the other students and think about the differences and similarities between them (Willem, Aiello, & Bartolomé, 2007).

**Collaborative learning** has been evolving for decades and has grown in popularity, especially in face-to-face classes (Picciano, 2009). The logistics and time needed for effective collaboration in face-to-face classes are sometimes problematic and this issue can be addressed with email, wikis and other electronic communication mediums. According to Bonk & Khoo (2014), we now live in a world of collaborative knowledge building and representation, and in the online environment, students can collaborate in a virtual student lounge where notes, links and files can be shared in real time.

**Synthesizing, evaluating and assessing learning** is, according to Picciano (2009), perhaps the most important component of this model. Picciano believes that online technologies allow more seamless opportunities for evaluation and assessment activities. CMSs and other online tools provide a number of mechanisms for assisting in this area. According to the Hanover research council (2009), while many CMSs provide tools for assessment and analysis, it is still the instructor's responsibility to determine if the assessment is appropriate to the subject. These tools are not only applicable for assessment activities, but also help instructors to assess and reflect on

their own teaching strategies in reviewing what worked and what did not work in a class (Picciano, 2009).

### **3.4.3 Puentedura's SAMR model**

The SAMR (Substituting; Augmentation; Modification; Redefinition) model was developed by Dr Rueben Puentedura (2010) to assist facilitators with the integration of technology into teaching and learning. With the SAMR model, Puentedura (2010) aims to enable facilitators to design and develop learning experiences where the integration of technology utilises higher levels of student achievement.

SAMR offers a guideline on how computer technology can be integrated into teaching and learning. As one moves along the continuum, computer technology becomes more important in the classroom and at the same time becomes more invisibly woven into the demands of good teaching and learning (Puentedura, 2010).

#### ***Substitution***

According to Puentedura (2010), technology is used as a direct substitute for existing classroom practices in the lowest level of this model. The original task does not change, but students do the same task with the introduction of technology. Examples include:

- Using electronic resources or eBooks instead of hardcopy resources.
- Using a note-taking application on a tablet to draft a document rather than handwriting with paper and pencil.
- Finding information online or in digital encyclopaedia rather than in books.

#### ***Augmentation***

At the level of augmentation, the same tool is used with some functional improvement (Puentedura, 2010). The tasks as such have not changed but they have been enhanced slightly. Examples include:

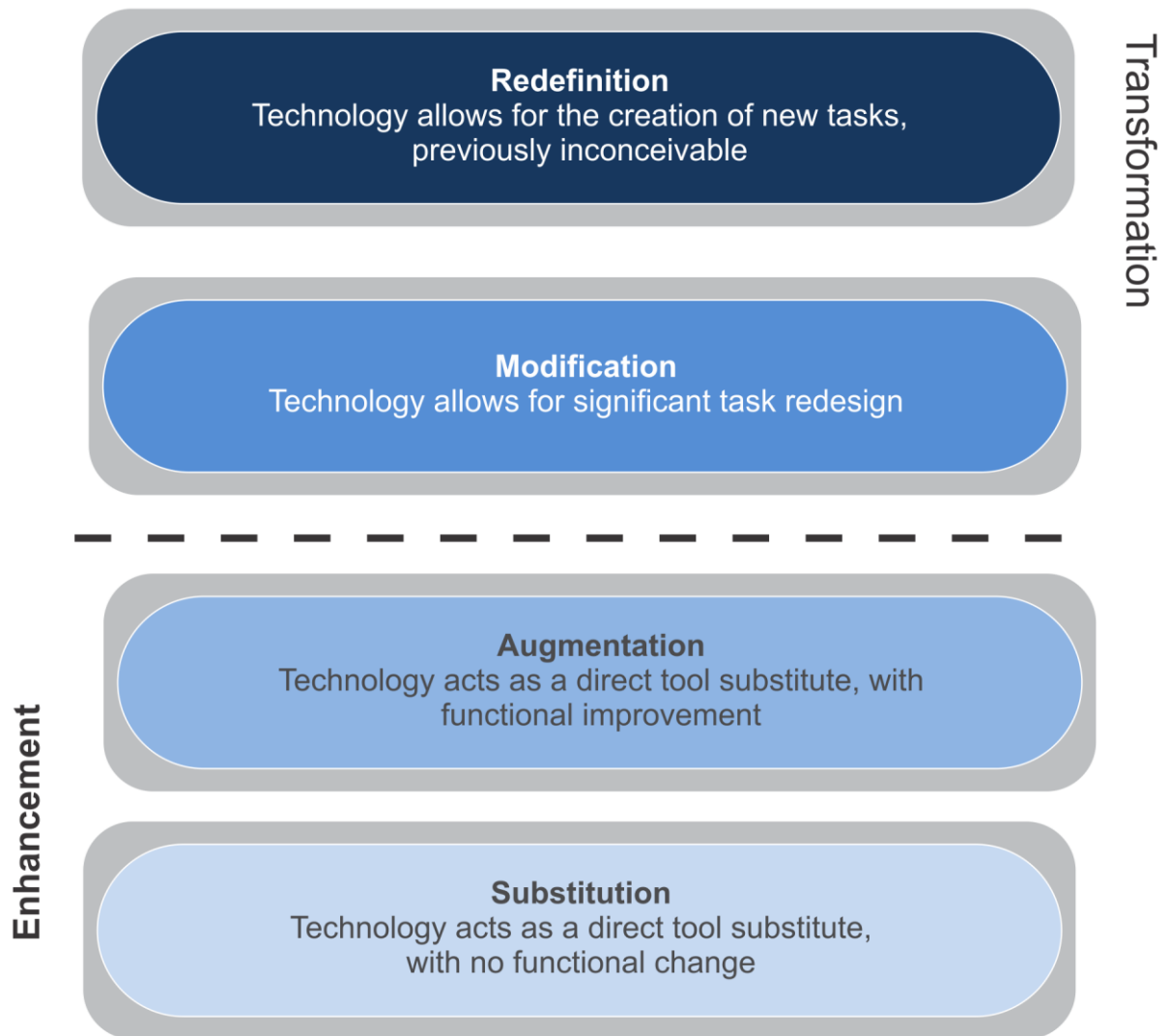
- Using basic functions of eBooks such as search and dictionary definitions.
- Using some built-in tools of the note-taking application such as the spell check, thesaurus, dictionary or cut-and-paste tools to enhance the classroom task.
- Using hyperlinks in text.

### ***Modification***

At the level of modification, the task at hand slightly alters but it does not change (Puentedura, 2010). Students are given a different kind of task that are accomplished through the use of computer technology.

An example is:

- Using spreadsheets to allow for the automatic calculation of sums and creating graphs for immediate visualisation of data. The spreadsheet can be e-mailed instead of being printed. A report, previously a fixed paper document, now has significant task redesign which results in substantial productivity increase.



**Figure 3.6** The SAMR model (Puentedura, 2010:1)

***Redefinition***

According to Puentedura, (2010), in the redefinition level available technology is used to completely redesign tasks so that the tasks are not possible to complete without the use of technology. These tasks are unique, technology-oriented activities for which there are no pen-and-paper alternatives.

Examples include:

- Creating a video blog.
- Creating collaborative mind maps.

#### **3.4.4 Bath and Bourke's blended learning design process**

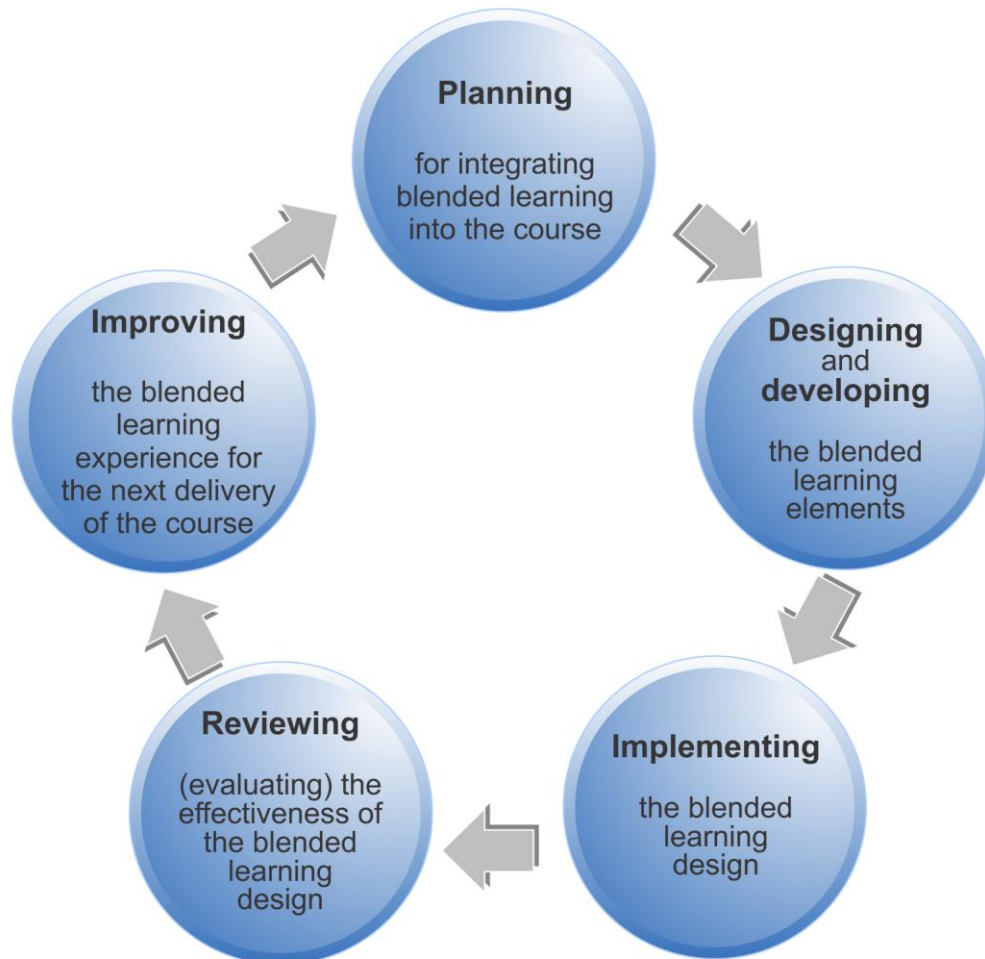
Good preparation and decision making are essential not only for efficient time management in the construction and maintenance of resources, but also for the creation of quality learning experiences for students. Ideally, BL experiences should be interactive as well as participative (Wild, 2007) so that the processes of cognition and collaboration are both enhanced. The BL design process suggested by Bath and Bourke (2010) (see Figure 3.7) addresses aspects to be considered in the design of a BL module.

##### ***Planning***

According to Bath and Bourke (2010), planning is the first stage of the design process. At this point the facilitator should take a number of critical considerations into account before starting to design the BL components of the course. In the planning phase, the facilitator should do a situation analysis of the current status of the course, considering the following:

- **Review course aims and learning objectives.** The facilitator should make sure existing outcomes, activities and assessments are aligned. According to Bath and Bourke (2010), the key elements of a blended module are: a) having clear, student-centred learning objectives, b) alignment between these objectives and course assessments, and c) meaningful, relevant use of technologies. As seen in §2.5.6.1, the decision to include CL tasks in a module should be based on a careful examination of course goals to help shape the design of the course and not only be an add on.
- **Undertake a content inventory.** It is important to evaluate the resources that are currently being used. It must be decided if the current formats (print, online, audio, video, etc.) are adequate and if the students had any issues accessing a resource in the past (Bath & Bourke, 2010). Bliuc et al. (2007) suggest that module content include multiple media and opportunities for students to be totally independent and to have a wide choice of resources that they can use.

- **Review current teaching strategies.** The facilitator must identify what is valuable and which must not be lost in moving online (Garrison & Vaughan, 2008). Current use of online strategies and decide how to improve or modify it must be evaluated (Bath & Bourke, 2010).



**Figure 3.7 The blended learning design process (Bath & Bourke, 2010:7)**

- **Review course management.** The elements of effective classroom management such as the preparation of the classroom as a physical environment suited to the nature of the planned academic activities, development and implementation of a workable set of house-keeping procedures and conduct rules, maintenance of student attention and participation in group lessons and activities, and monitoring of the quality of the students' engagement in assignments and of the progress they are making toward intended outcomes are equally

relevant in a BL environment (Scheerens, 2010). Bath and Bourke (2010) suggest that facilitators decide on any aspects that they would like to improve either from their own or their students' perspective.

- **Obtain student feedback.** According to Jara and Mellar (2010), student feedback is a central strategy to monitor the quality and standards of teaching and learning in higher education institutions. It is important when redesigning a course to find out what worked well for the students and what could be improved in the course.
- **Consider the student profile.** When redesigning a course it is important to establish if the students experienced BL in a previous module and consider providing time and resources for students to gain familiarity and the required skills to use particular technologies before they have to formally engage with it (Bath & Bourke, 2010). The accessibility of the specific technologies, number of students in the class and their attitude towards technology should also be taken in consideration (Garrison & Kanuka, 2004; Zhang, 2009; Bath & Bourke, 2010).

### ***Designing and developing***

Once the planning phase is done, the facilitator can start designing the BL components of the course. Bath and Bourke (2010) list five basic design principles to keep in mind when developing a course or blended activities.

- **Constructive alignment** – learning outcomes, teaching and learning activities, and assessment tasks need to be aligned and correspond with each other (Risner, 2011; Kim, Olfman, Ryan & Eryilmaz, 2014).
- **Purposeful and authentic assessment** – assessment activities should be purposeful and authentic with as much relevant, real-world activities as possible so that students can demonstrate their competency in a more true-to-life setting (Anderson, 2004; Futch, 2005; Saliba et al., 2013).
- **Alignment of activities** – teaching and learning activities need to be clearly aligned with time and content. Any BL element should be clearly integrated with the content and the learning objectives of a course, and should complement the face-to-face and/or individual activities (Risner, 2011; Kim et al., 2014; McGee & Reis, 2012).

- **Student workload** – the workload for a BL course should not exceed that of a course in traditional face-to-face mode (Marsh, 2012; McGee & Reis, 2012).
- **Time management** – according to Bath and Bourke (2010), a facilitator should keep the time, effort and resources involved in developing BL in proportion to the impact or importance in the course. For example, weeks should not be spent designing and developing a small element of a course unless the pay-offs for the facilitator and the students are worth it (Bath & Bourke, 2010; Saliba et al., 2013).

### ***Implementing***

According to Bath and Bourke (2010), a well-designed BL element can fail, or at least suffer significant drawbacks, if time and consideration is not given to a range of issues associated with the implementation of BL in a course. The following aspects need to be in place before implementation:

- **Testing of online components** – the online components of the course need to be trialled and tested and the facilitator should be competent in using these components (Garrison & Vaughan, 2008; Bath & Bourke, 2010).
- **Support** – the facilitator should identify what common problems or difficulties may be experienced by students in using the chosen online tools and design an action plan for student support (Williams 2010; Ragan, 2007).
- **Course orientation** – when students are required to study online, even if it is only for part of a course, creating an opportunity for some form of course orientation is an important first step in building a successful learning and teaching experience (Bath & Bourke, 2010; Ragan, 2007). During a course orientation it is important to explain to students the rationale for blending and what is expected of them. They need to be given some guidelines on netiquette and examples on how to use specific tools (Futch, 2005; Ragan, 2007).

If the aspects mentioned above are in place, the facilitator can start implementing the course. The following aspects should be taken in consideration while implementing the course:

- **Online presence** – the facilitator should establish an online presence by participating in discussions, providing opportunities and encourage students to engage with each other and integrating topics that were discussed online in the face-to-face sessions (Garrison & Kanuka, 2004; Ragan, 2007; Bath and Bourke, 2010).
- **Motivate students** – it is important to continue to promote and encourage students' use of the BL components throughout the course (Lindsay, 2004; Garrison & Vaughan, 2012; C2.5.3) Facilitators can send students reminder via email or the chosen method of communication (Bath and Bourke, 2010). Breaking up a task into smaller components and give feedback on some or all of these components also helps (Marsh, 2012).
- **Monitor student participation** – facilitators should give recognition of students' engagement in the course both online and in class. It helps to validate students' efforts and the contribution of the various course activities to their learning (Jara & Mellar, 2010; Bath & Bourke, 2010). Facilitators should identify students who do not appear to be engaging and initiate some communication with them (Lindsay, 2004; Marsh, 2012).

### ***Reviewing***

As with any course, obtaining feedback about various aspects of the course is a crucial part of the course design process (Bath & Bourke, 2010). Gaining valuable feedback helps the facilitator to review different aspects of the course and consider where improvements can be made to enhance the course for future iterations (Garrison & Vaughan, 2008; Bath & Bourke, 2010). The following types of evaluation can be used:

- **Self-evaluation** – facilitator should evaluate their pedagogy by reflecting on the learning activities which underpin the unit, the content and resources provided for the students and the teaching strategies used during the course (Garrison & Vaughan, 2008; Bath & Bourke, 2010).

**Peer-evaluation** – one or more colleagues in the faculty should be asked to evaluate the resources and study material (López-Pérez et al., 2011). It will be good if they could sit in on some of the classes and visit the online environment to get an idea of the course structure (Montaño, Cardoso & Joyce, 2004; Bath & Bourke, 2013).

- **Student evaluation** – feedback from students can be obtained by asking informal questions after an activity or class, students filling in a student evaluation questionnaire at the end of the module and from their performance on assessment, in-class, out-of-class or online activities. (López-Pérez et al., 2011; Bath & Bourke, 2012).

### ***Improving***

At the improvement stage, the BL design process starts all over again to incorporate all the changes made to improve the course for the next student intake (Bath & Bourke, 2010). Simmons College (2008) identified a number of challenges that facilitators might encounter and created a checklist that can be used as a tool to evaluate a course with some suggestion to fix the problem. The checklist focuses on aspects such as student preparation, technical aspects and student understanding. If students are not prepared for class, they can be engaged by preparation activities such as self-assessment quizzes before they come to class (Ross, 2012; McDonald, 2012). When the facilitator is unsure if the students understand the material, they should provide more opportunities for assessment and student reflection (Willem et al., 2007; Munir & Prem, 2012). If students are struggling with technical problems such as not finding the material or having trouble downloading files, the facilitator should consider spending more time at the beginning of the module to familiarise the students with technicalities and making sure they understand these processes (Ragan, 2007; Bonk & Khoo, 2014). The facilitator should take the self, student and peer evaluation in consideration and try to improve on the aspects that did not contribute to a better learning environment.

#### **3.4.5 Synthesis of models for developing blended learning programmes**

In Table 3.1 a short summary of the models, categorised according to the concepts identified by Bath and Bourke (2010), is given and in Figure 3.8 a combined model for the development of a BL course is shown.

Mishra & Khoeler's (2006) TPCK model focuses on the fact that facilitators should have in-depth knowledge about pedagogy, subject content and technology. In terms of planning a BL module, facilitators should assure that all aspects of teaching and learning are integrated and aligned to contribute to the learning process. It is of utmost importance that when designing a blended course, facilitators find interesting ways to present subject content and should have the knowledge to determine what kind of activity (face-to-face or online) would be the most appropriate way to help

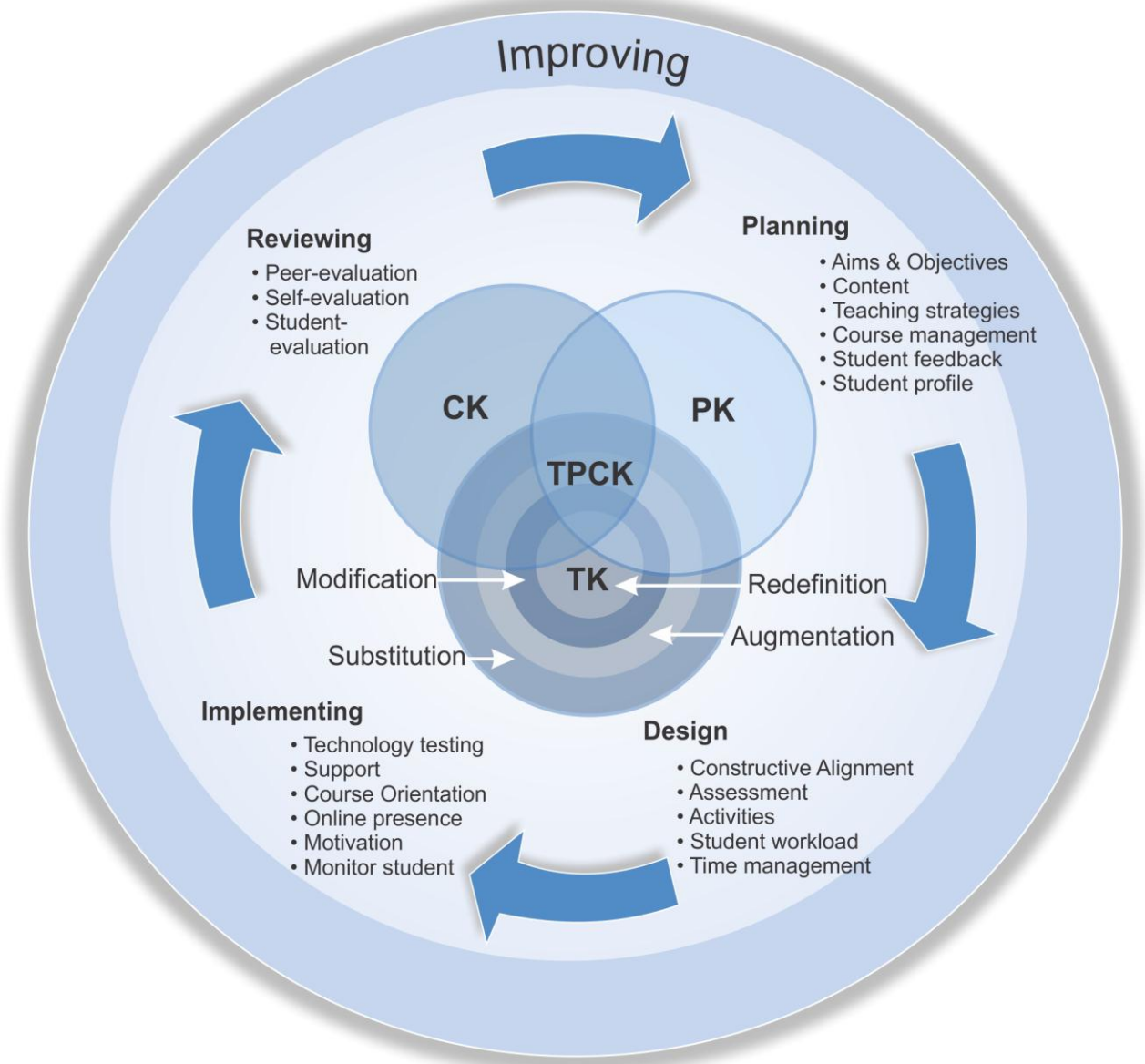
students master a specific section of the work. Facilitators should have the necessary technological knowledge to support and assist students in using the prescribed software or systems to assure that the technology does not become a barrier to learning. TPCK focuses on the required skills that facilitators need to ensure the successful integration of technology in a module. It does not focus much on all the other aspects of course development such as assessment, classroom management, evaluating and improving a course. Nevertheless, this model is the very basis of designing a BL course and without all three key sources of knowledge (technology, pedagogy, and content), the facilitator will not be able to design good content and make sure the module structure and overall educational purposes are in place.

Picciano (2009) focuses on a number of important aspects when designing a BL course. He agrees with Mishra & Khoeler that multiple technologies and media should be exploited and that it should support a specific goal, task or outcome. However, facilitators need to carefully consider their objectives and understand how to apply the chosen technologies and approaches. Student support is another essential aspect that Picciano (2009) addresses. He advises that although fully online courses and programmes have evolved to the point where faculty can provide some support, in blended courses and programmes this might best be provided in a face-to-face mode. It is also necessary to monitor student activities to find who is falling behind or feeling isolated. The evaluation and improvement of a course are also included in his model. Feedback help facilitators to assess and reflect on their own teaching strategies in reviewing what worked and what did not work in a class. Most of the important components of this model are also included in Bath & Bourke's (2006) model.

Like Mishra & Khoeler's (2006) model, Puetendura (2010) focuses more on the integration of technology in a model and not explicitly on other aspects. His model indicates that the integration of technology should occur in phases and that, as students get used to using technology, former face-to-face activities can be conducted by means of technology. Technology can be used to modify and redefine assessment tasks. However, as facilitators familiarise students with the use of technology, they should gradually move from substitution to redefinition. The end goal is to design and develop learning experiences where the integration of technology utilises higher levels of student achievement.

All of the models discussed offer valuable tools and guides in the development of a BL course, but the model presented by Bath and Bourke (2010) integrates the highest number of design components and it provides the most complete guide toward the design of a BL course. Although

Bath and Bourke’s model gives thorough insight into the design process, the other three models cannot be disregarded and all four the models combined give the most comprehensive model for designing a BL course. In Figure 3.8 and Table 3.1, all four models are combined to give a holistic perspective on the design of a BL course.



**Figure 3.8 A combined blended learning design model**

**Table 3.1 Combined components of blended learning design models**

	BL design components	Models			
		Mishra & Khoeler (TPCK)	Picciano (Multimodal)	Puentedura (SAMR)	Bath & Bourke (Design Process)
Planning	<b>Aims &amp; objectives</b>	Pedagogical knowledge is needed to assure that all aspects of teaching and learning are integrated and aligned to contribute to the learning process.	Instructors need to carefully consider their objectives and understand how to apply the chosen technologies and approaches.	Nothing explicit.	Facilitators should make sure outcomes, activities and assessment are aligned.
	<b>Content</b>	Facilitators should not only evaluate the academic quality of the resources but they should also identify various technologies and techniques to present the resources in such a way that it promotes learning.	Multiple technologies and media should be exploited but it must support a specific goal, task or outcome and, where possible, promote interactivity.	Recourses and module content that was previously distributed in a non-electronic manner can now be substituted with online resources.	Facilitators should evaluate current resources to make sure they are adequate for a BL environment
	<b>Teaching strategies</b>	Facilitators are not only expected to know how students construct knowledge, acquire skills, and have positive dispositions toward learning, it is also important to be informed about what technologies are available and how to use these effectively to enhance learning.	Collaborative learning is encouraged. Students can collaborate in a virtual student lounge where notes, links and files can be shared in real time.	Facilitators should use technology to enhance certain learning tasks. By moving from substituting some resources through to redefining learning tasks, students can experience a much more interactive learning environment.	Facilitators should decide how to modify or improve current online strategies and see if some of the face-to-face strategies can be adopted for the online environment.
	<b>Course management</b>	Nothing explicit.	As with the face-to-face component of the course, online activities should be well organised. It is important to track student progress, for which LMSs (learning management system) are useful.	Nothing explicit.	Facilitators should develop a set of rules for face-to-face and online activities and decide on ways to monitor student participation and progress.

**Table 3.1 Combined components of blended learning design models (continue)**

	BL design components	Models			
		Mishra & Khoeler (TPCK)	Picciano (Multimodal)	Puentedura (SAMR)	Bath & Bourke (Design Process)
Planning	Student feedback	Nothing explicit.	Student reflections are a powerful pedagogical strategy to get feedback on their learning and other aspects of course activities.	Nothing explicit.	Facilitators should use student feedback to improve teaching strategies and activities.
	Student profile	Context-specific strategies and representations are required for quality teaching and no single technological solution is generic for every facilitator, course or teaching perspective.	Nothing explicit.	Nothing explicit.	Facilitators should take into consideration students' prior BL experience, accessibility of specific technologies as well as students' skills and attitude to using technology.
Design & Develop	Constructive alignment	Facilitators should have proper pedagogical knowledge to make sure the module structure and overall educational purposes are in place.	Pedagogical objectives of a course should drive the activities.	Nothing explicit.	Learning outcomes, teaching and learning activities, and assessment tasks need to be aligned and correspond with each other.
	Assessment	Nothing explicit.	Online technologies allow more seamless opportunities for evaluation and assessment activities.	Technology can be used to modify and redefine assessment tasks.	Assessment should be purposeful and authentic real-world activities.
	Activities	Facilitators should have the knowledge to determine what kind of activity (face-to-face or online) would be the most appropriate way to help students master a specific section of work.	Activities should not only be applicable for assessment but also help facilitators to reflect on their own teaching strategies in reviewing what worked and what did not work in a class.	As students get used to using technology, former face-to-face activities can be conducted by means of technology.	Activities need to be clearly aligned with time and content.
	Student workload	Nothing explicit.	Nothing explicit.	Nothing explicit.	Student workload should not exceed that of a traditional face-to-face course.

**Table 3.1 Combined components of blended learning design models (continue)**

	BL design components	Models			
		Mishra & Khoeler (TPCK)	Picciano (Multimodal)	Puentedura (SAMR)	Bath & Bourke (Design Process)
	<b>Time management</b>	Nothing explicit.	Nothing explicit.	Nothing explicit.	Facilitators should keep the time and effort spent on an activity in proportion to the impact or importance in the course.
<b>Implementing</b>	<b>Technology testing</b>	Facilitators should make sure they know how various technologies work and how those technologies can be used in teaching and learning settings.	Nothing explicit.	Nothing explicit.	Technologies should be trialled and tested and the facilitator should be competent in using it.
	<b>Support</b>	Facilitators should have the necessary technological knowledge to support and assist students in using the prescribed software or systems.	Although fully online courses and programmes have evolved to the point where faculty can provide some support, in blended courses and programmes this might best be provided in a face-to-face mode.	Facilitators should familiarise students with the use of technology and gradually moves from substitution to redefinition by designing and developing learning experiences where the integration of technology utilises higher levels of student achievement.	Facilitators should identify common problems or difficulties and design an action plan for student support.
	<b>Course orientation</b>	Nothing explicit.	Nothing explicit.	Nothing explicit.	Facilitators should explain to students the rationale for blending and what is expected of them.

**Table 3.1 Combined components of blended learning design models (continue)**

	BL design components	Models			
		Mishra & Khoeler (TPCK)	Picciano (Multimodal)	Puentedura (SAMR)	Bath & Bourke (Design Process)
	<b>Online presence</b>	Nothing explicit.	When facilitators ask the right questions on a discussion board, it can stimulate discussion and help students to think critically about certain aspects which will help refine their knowledge.	Nothing explicit.	Facilitators should participate in discussions, providing opportunities and encouraging students to engage with each other.
	<b>Motivation</b>	Nothing explicit.	Nothing explicit.	Nothing explicit.	Facilitators should continue to promote and encourage students' use of BL components.
	<b>Monitor students</b>	Nothing explicit.	The use of student blogs and student progress reporting available with many LMSs provide the facilitator with a good overview of who is falling behind or feeling isolated.	Nothing explicit.	Facilitators should give recognition of students' engagement and communicate with students who don't appear to be engaging.

**Table 3.1 Combined components of blended learning design models (continue)**

	BL design components	Models			
		Mishra & Khoeler (TPCK)	Picciano (Multimodal)	Puentedura (SAMR)	Bath & Bourke (Design Process)
Reviewing	Self-evaluation	Nothing explicit.	Facilitators should reflect on their own teaching strategies in reviewing what worked and what did not work in a class.	Nothing explicit.	Facilitators should reflect on the learning activities.
	Peer-evaluation	Nothing explicit.	Nothing explicit.	Nothing explicit.	Colleagues in the faculty should be asked to evaluate the resources, study material and class activities.
	Student evaluation -	Nothing explicit.	Group or individual blogs can be appropriate tools for students reflecting on their learning and other aspects of course activities.	Nothing explicit.	Feedback from students can be obtained by asking informal questions or filling in a student evaluation questionnaire.
Improving	Use feedback	Nothing explicit.	Feedback help facilitators to assess and reflect on their own teaching strategies in reviewing what worked and what did not work in a class.	Nothing explicit.	The facilitator should take self, student and peer evaluation into consideration and try to improve on the aspects that did not contribute to a better learning environment.

### 3.5 BENEFITS OF BLENDED LEARNING

The most common benefit for BL provided in literature is that it combines “the best of both worlds” (Dziuban, Moskal & Hartman, 2005; Woodall, 2012; Garrison & Vaughan, 2013; Tang, 2013). The literature converges on several value-added components of BL. The benefits can be grouped into two categories: more effective pedagogy and improved outcomes. The benefits concerning each of these aspects will be listed in the section below:

#### *More effective pedagogy*

- Because pedagogical strategies may be drawn from both the face-to-face and online environment, BL provides the largest set of instructional methods and learning situations to meet the needs of disciplines, courses and students (Woodall, 2012; Garrison & Vaughan, 2013; Tang, 2013).
- Interaction is one of the most frequently discussed strategies of BL and is an example of where the best of both learning environments may be exploited. Most studies indicate that both student-to-student and student-to-faculty interaction significantly increases in blended courses (Futch, 2005; Picciano, 2009; Kim et al., 2014).
- In a blended environment, students become active students because of the transformation from a teacher-centred to a student-centred focus. They are expected to engage interactively with each other and with the study material to reach the goals and outcomes (Futch, 2005; Watson, 2008; Singelton, 2012).
- Real-world activities and authentic assessment are made possible in a blended environment with the use of numerous online resources. It ensures that students see the importance and value of the work they have to learn (Anderson, 2004; Futch, 2005; Saliba et al., 2013).
- It allows integration of formative and summative assessment mechanisms for students and facilitators, balancing independent learning with human interaction and motivating students to discipline themselves in an online environment (Garrison & Kanuka, 2004; Simco & Campbell, 2011; Chou & Chou, 2011).
- Online discussions allow students to contribute, build shared ideas, reflect and build an online community. This active engagement with course content helps students to

learn and apply course content and it gives students an enhanced sense of empowerment (Picciano, 2009; McGee & Reis, 2012; Kim et al., 2014).

- By extending the discussion beyond the classroom, students have an opportunity to reflect, produce more thoughtful responses and benefit from other responses and they are more likely to participate (Lord & Lomicka, 2008; Tang, 2013).
- The BL format provides a more flexible use of instructional time to achieve goals and objectives more successfully (Zhang, 2009; Singelton, 2012; Spencer, 2013).
- Online content allows students unlimited access to resources which enables them to spend more time on new or difficult material (Futch, 2005; Hein, 2013).
- Online components are a way to motivate students to stay up to date with material, e.g. timed quizzes that provide immediate feedback and reminder dates (Lindsay, 2004; Garrison & Vaughan, 2012; Marsh, 2012).
- Overwhelmingly, students report the convenience of time flexibility as the most popular feature of blended courses (Lindsay, 2004; Bliuc et al., 2007; Heller, 2010; McGee & Rice, 2012).

#### *Improved outcomes*

- Because students explore and practice new learning material on their own time and at their own pace according to their own personal learning needs, they come to class better prepared (Holley & Oliver, 2010; Marsh, 2012).
- Students are more confident in their ability to participate in classroom activities (Brophy, 2010; Marsh, 2012).
- Because of more active, meaningful and student-centred learning activities, students master the content and perform better in exams (Garrison & Kanuka, 2004; Futch, 2005; Partridge, Ponting & McCay, 2011).
- Students participate in deeper and more meaningful discussions on course material (Futch, 2005; Xie, Durrington & Yen, 2011).
- Students demonstrate a better understanding and deeper exploration of concepts (Chou & Chou, 2011; Kim et al., 2014).

### **3.6 CHALLENGES OF BLENDED LEARNING**

This section briefly outlines a number of challenges that are relevant to designing BL systems.

- Before a BL scenario can be considered ready for use, the facilitator has to do long, detailed and extensive work which can be very time consuming (Futch, 2005; Risner, 2011; Bonk & Khoo, 2014).
- Students often prefer and are more comfortable with the paper versions of the materials than to see them online (Bliuc et al., 2007; Ross, 2012; Lack, 2013).
- Some students still prefer to attend classes and they feel afraid and unfamiliar in the online environment (Picciano, 2009; Ross, 2012; Lack, 2013).
- Students sometimes feel that they are given more work in blended courses (Glogowska, Young, Lockyer & Moule, 2011; McGee & Reis, 2012).
- Blended courses can prove to present a high learning curve for both facilitators and students in terms of technologies and the new learning environment (Singelton, 2012; Bonk & Khoo, 2014; Kim et al., 2014).

### **3.7 IMPLEMENTING COOPERATIVE LEARNING IN A BLENDED LEARNING ENVIRONMENT**

In chapter two, the implementation of CL to enhance IM (refer §2.5.6) was discussed. In the next sections, the discussion will focus on the implementation of CL to enhance IM specifically for a BL environment according to the combined BL design module.

#### **3.7.1 Planning**

##### ***Aims and objectives***

Facilitators need to have the pedagogical knowledge to make sure that all the aspects of teaching and learning are aligned. To do this, they should carefully consider their aims, objectives and teaching strategies. When they choose to use technology, they should make sure that they understand how to use it to enhance learning and collaboration (refer §3.4.1; §3.4.2; §3.4.4). According to Ragan (2007), the facilitator should communicate certain course-specific information to the students and ensure constructive alignment of goals,

outcomes and assessment (refer §2.4.1.1; §2.5.6.1). Clearly stated learning goals and constructive alignment help students to understand exactly what is expected of them and make them see the relevance of what they need to do (Ding et al., 2010). In a CL environment, clearly stated learning goals also foster positive interdependence among group members. As seen in §2.5.6.1, setting explicit learning goals and defining the learning tasks that is directed towards a specific goal create an opportunity for students to experience success. It is also evident from §2.5.6.1 that, with the integration of CL tasks in a face-to-face classroom, learning goals should be explicitly defined by the group or the facilitator (refer §2.4.2.1), and it should be integrated into the course design and not be treated as an add-on. As with the face-to-face classroom, the facilitator in a BL environment should clearly define what the expected objectives, learning strategies, resources and evaluation criteria are (Shimazoe & Aldrich, 2010).

In a blended environment, course-related information can be made available to the students in a functionality of the LMS where it can be visible and available for the entire duration of the course and referred to regularly. However, because CL facilitators strive to foster self-directed students, it implies that students also can be part of the process of designing their learning scenarios and help to define and clarify learning objectives (Wilem, Aiello & Bartolomé, 2007). A collaborative wiki page or a class discussion can be used to involve the students in planning and deciding upon learning aims and objectives. Assessment criteria for each task can be made available in the form of an announcement that goes out from the LMS or as part of the assignment so that students can be sure of what exactly is expected from them when completing the assignment or task. For CL tasks, the facilitator should communicate the group sizes and role of each member of the group beforehand. The students should also understand the importance of working together with regards to individual accountability, positive interdependence and social skills (refer §2.4.1). This information could be made available in a simple announcement. If the students are still unfamiliar with CL tasks, a class discussion in the contact session or in the forum functionality of the LMS could be held.

### ***Content***

When integrating CL into a BL module, the facilitator should not only evaluate the academic quality of the resources but they should also make sure the resources are adequate for both CL and a BL environment (refer §3.4). Various technologies and techniques should be identified to present the resources in such a way that it promotes learning (refer §3.4). The facilitator should decide if the resources should be made available to the students or whether

they should find it on their own. When the facilitator shares the process finding and organisation content with the CL groups, the students get the opportunity to take control of their own learning (refer §2.5.6.3). Multiple technologies and media should be exploited but it must support a specific goal, task or outcome and, where possible, promote interactivity (refer §3.4). Recourses and module content that was previously distributed in a non-electronic manner can be substituted with online resources (refer §3.4).

### ***Teaching strategies***

To decide on the most appropriate teaching strategies, facilitators are not only expected to know how students construct knowledge, acquire skills and maintain positive dispositions toward learning, but it is also important to be informed about what technologies are available and how to use these effectively to enhance learning (refer §3.4.1). Facilitators should have a good knowledge of the face-to-face CL strategies and seek ways to modify and adopt these strategies for a BL environment (refer §3.4.2). Students can, for example, collaborate in a virtual student lounge where notes, links and files can be shared in real time. By moving from substituting some resources to redefining learning tasks, students can experience a much more interactive learning environment (refer §3.4.3).

### ***Course management***

As with the face-to-face component of a course, online activities should be well organised and structured (§3.4). It is important to monitor student progress and participation, something LMSs can assist with (§3.4.4). Facilitators should engage CL groups to develop a set of rules for face-to-face and online activities (§2.4.2.1), involving students on a different level and giving them a sense of responsibility.

### ***Student feedback***

Student reflections are a powerful pedagogical strategy to get feedback on student learning and other aspects of course activities (refer §3.5.2). It is also important for students to reflect and evaluate a specific task. Facilitators can use group and student feedback to improve teaching strategies and activities. As seen in §3.5.4, feedback from students can be obtained by asking informal questions after an activity, or students can fill in an online questionnaire at the end of the module (López-Pérez et al., 2011). A discussion forum or wiki can also be used to reflect, either as group exercises or for individual journaling activities. As seen in §3.3.2, group reflection allows students to compare their work with those of other students and think about the differences and similarities between them (Willem, Aiello & Bartolomé,

2007; Bath & Bourke, 2010). When students challenge each other's work and provide positive feedback, they facilitate each other's efforts to succeed through promotive interaction (Johnson & Johnson, 2009; Heath, 2010; refer §2.4.3.1).

### ***Student profile***

It is important that facilitators establish the students' prior BL and CL experience. They need to find out if the specific technologies that they want students to use are accessible, and what students' skill level and attitudes are regarding use of technology (refer §3.4.4).

## **3.7.2 Design**

### ***Constructive alignment***

Facilitators should have proper pedagogical knowledge to make sure the module structure and overall educational purposes are in place (refer §3.4.1). Pedagogical objectives of a course should drive the activities and learning outcomes as well as teaching and learning activities, and assessment tasks need to be aligned and correspond with each other (refer §3.4.2; §3.4.4).

### ***Assessment***

According to Ning (2010), facilitators can use any form of assessment, as long as students know exactly what is expected of them and it is in line with the learning task (refer §2.5.6.4). According to Xiufang and Qingchao (2008), assessment in a BL environment combines a number of assessments, including formative and summative assessment, and a combination of traditional and web-based assessment. In choosing BL approaches to assessment, it is important to revisit course learning objectives and consider the nature of what the students are to demonstrate (Picciano, 2009). When CL tasks are assessed, students can in some cases be assessed individually for a specific task or section of the work (Tsay & Brady, 2010), promoting individual accountability (refer §2.5.1.2). However, students can also be assessed on how well they functioned within the group (Johnson & Johnson, 2009a), referring to group processing (§2.5.1.5). Most of the CL techniques suggest a form of assessment that compliments the specific technique (refer §2.5.3). Bath and Bourke (2010) believe that planning well in advance is of utmost importance for the successful implementation of assessment tasks using technology. Facilitators should make sure their students know how to use the technology, where to go for technical support and assistance, how the assessment task should be submitted, how their work will be assessed (by providing

a clear set of criteria and standards, or a rubric), and when feedback and marks will be provided (refer §3.5.3).

### **Activities**

In §2.5.5.2 the following administrative aspects to keep in mind when designing CL tasks and activities were listed: (a) size and structure of the group; (b) allocated time; (c) layout of learning space; (d) roles of group members and (e) accessibility and distribution of relevant resources. When working in a BL environment, it is important to add to that list the fact that the facilitator will have to decide if the task will be conducted in the face-to-face classroom, in the online environment or in a combination of the two (McDonald, 2012). As seen in the planning phase of the combined BL design model (refer §3.4.5), student activity beyond the classroom should ideally involve a combination of both individual and collaborative activities, as well as both formal and supplementary activity and resources to support students in their learning and achievement of the course objectives. Facilitators should have the knowledge to decide which kind of activity would be the most appropriate to master the specific section of work. The level of learning that students achieve is often dependent on the type of activities and assessment tasks, and whether those are aligned with the set outcomes (refer §3.7.1) or desired learning outcomes (Saliba et al., 2013).

Bloom's taxonomy has been revised to suit a BL environment (Churches, 2008). This revision includes suggestions for tasks that can be used to support particular objectives (Table 3.3). Bath and Bourke (2010) state that before deciding on a particular tool or application, it is important to first define the purpose of the activity. Churches (2008) suggests a number of BL activities to choose from in each of Bloom's levels. An example of how activities from each of Bloom's levels can be implemented in a CL environment is discussed below:

- **Remembering** (recognising, listing, describing, identifying, retrieving, naming, locating)

Each student can be asked to master a specific section of the work and write an online test or quiz on it. Only when all the students in a CL group have completed their tests, will the group be able to access the rest of the content or get the group task. The group task can be executed in the form of a jigsaw so that the students can learn from each other (refer §2.4.3.3). This strategy will address positive resource independence (§2.4.1.1) and individual accountability because the

students are not only responsible for mastering the work for their own benefit but the group is depending on each member's contribution as well (refer §2.4.1.2).

- **Understanding** (interpreting, summarising, paraphrasing, classifying, explaining, comparing)

Students can be expected to find information on a specific topic and, in a group, master the information to present to the other groups. Group members should be assigned to specific roles and know what is expected of them. The information that they find should be structured and presented in such a way that the other groups will be able to master the presented content from the medium made available online by the responsible group. This strategy will establish positive reward and positive role interdependence (§2.4.1.1). The students will then receive a group mark for the final product. The facilitator can decide if the students should grade each other for their contribution as part of the final mark.

- **Applying** (implementing, carrying out, using, executing, editing)

Each group can be given a real-life problem to solve. The group then has to participate in an online discussion forum to give ideas on how to solve the problem. Each student will then be graded on the relevance and intellectual level of their contributions to the forum. It should be evident in their posts that they mastered the theoretical aspects of the work and know how to apply it to a real-life situation. This activity can also be used to guide and train their higher order thinking skills (e.g. reasoning), which will benefit them later in the module when writing an exam. Even in an online environment, promotive interaction (§2.4.1.3) and the appropriate use of social skills (§2.4.1.4) can be established when students facilitate each other's efforts to succeed in the group's goal.

- **Analysing** (comparing, organising, deconstructing, interrogating, structuring)

A video of a specific situation or real-life problem can be given to each group. The group has to review and analyse the video by means of specific criteria. The criteria will be listed as headings in a wiki page and the group members need to contribute to and modify the wiki page to generate one document that will be handed in for a group mark. The group should also reflect on the contribution of each group member and how they handled the assignment. This strategy will result in group processing

(refer §2.4.1.5) and their reflections can influence the way in which similar activities will be handled in future.

- **Evaluating** (checking, hypothesising, critiquing, experimenting, judging, testing)

Based on a scenario, students can be asked to research, for example, the best teaching strategy to facilitate a specific topic. They should present the details about the teaching strategy and how it works in a collaborative wiki page. The group members then have to create a report on why they made certain choices and why the specific strategy is the best one. Throughout the activity, students should communicate in a discussion forum to distribute the work and make decisions regarding the assignment.

- **Creating** (designing, constructing, planning, producing, inventing)

As a follow on, on the above-mentioned assignment under “evaluating”, group members can be expected to stage a classroom situation and conduct a role play on how the teaching strategy should be carried out. The performance can be filmed and uploaded in the LMS so that the other groups can comment and evaluate their interpretation of the teaching strategy.

### ***Student workload***

When designing a BL module, the workload should not exceed that of a traditional face-to-face course (refer §3.4.4).

### ***Time management***

The time and effort for both designing learning tasks and the time it takes students to complete a specific task should be kept in proportion to its impact or importance in the course (refer §3.4.4).

## **3.7.3 Implementing**

### ***Technology testing***

Facilitators should not only make sure that they know how various technologies work, but also how those technologies can be used in CL teaching and learning settings and if the chosen technology is suitable for a specific task (refer §3.4.1). The chosen technologies

should be trialled and tested, and the facilitator should be competent in using it and providing support for the students (refer §3.4.4).

### ***Support***

Brockett and Hiemstra (1991) believe that students should know what is expected of them in terms of objectives, learning strategies, resources and evaluation criteria (refer §3.4.3). Facilitators need to understand that both CL (refer §2.5.6.5) and BL might be new and unfamiliar concepts to the students, and good guidance and direction are needed for students to succeed (Ning, 2010).

Facilitators should have the necessary technological knowledge to support and assist students in using the prescribed software or systems (refer §3.4.1). Although fully online courses and programmes have evolved to the point where faculty can provide some support, in blended courses and programmes this might best be provided in a face-to-face mode (refer §3.4.2). Facilitators should familiarise students with the use of technology and gradually move from substitution to redefinition by designing and developing learning experiences where the integration of technology utilises higher levels of student achievement (refer §3.4.4).

In a CL environment, the facilitator should also guide the students in the appropriate use of social skills. Group members should understand that the group has to take responsibility for and support each other (refer §2.3.1). Although students still remain responsible for their own learning, promotive interaction cannot occur when students do not facilitate each other's efforts to succeed in the group's goal through supportive interaction (refer §2.4.1.3).

Learning outcomes and objectives can be made available in the LMS. Assessment criteria can be made available in the form of an announcement or as part of the assignment so that students can be sure of exactly what are expected from them when completing an assignment or task. Group members should understand their specific roles, and when they are expected to use different CL techniques (refer §2.4.3), they should understand the method to follow to complete the task successfully.

### ***Course orientation***

Facilitators should explain the rationale for a different approach than traditional face-to-face lecturers for a particular module. Students should understand what BL is and why they would sometimes be required to work in collaborative groups (refer §3.4.4). As seen in §2.5.5.3, the facilitator should also familiarise the students with process skills needed to complete specific tasks, such as goal setting, reflection writing, conflict management, social skills, and responsibilities of different role players in the CL group. According to Bath and Bourke

(2010), there are many existing online resources that can be utilised to support students' generic skill development as well as their knowledge and understanding of course-specific topics. Facilitators can include these resources as adjunct to the core course materials or integrate them as part of the official curriculum as tutorial-type activities. These materials can be integrated in the LMS and facilitators can ensure that students did indeed access the tutorial or online activity by marking it as required so that students will not be able to continue to the next activity before they completed the previous one.

### ***Online presence***

In §2.5.5.6, it was made clear that facilitators should act as mediators in CL activities. They should provide regular feedback and interrupt discussion to introduce new ideas (Johnson et al., 2013). This is no different in a BL environment. When CL tasks take place in the online environment, it is just as important for the facilitator to be visible and facilitate the task. Teaching presence in an online environment include the ability to organise and shape course design, establishing time parameters and "netiquette", and being in charge of every classroom situation (Daspit & D'Souza, 2012; Singelton, 2012). Facilitators should also facilitate discourse that stimulates student engagement and interaction in scheduled activities to make sure that groups are functioning properly and stay on course (Garrison, Anderson & Archer, 2010).

There are numerous possibilities to facilitate CL in an online environment. Discussion boards and live chat tools enable students to post urgent questions and seek help from fellow students or the facilitator between contact classes. Facilitators can easily divide students into discussion or collaborative groups. These groups can meet online and do not have to arrange face-to-face meeting to complete an assignment or learning task. Students should be able to get to know each other and accept each other's opinions to promote collaboration (Oswalt, 2003). There are also numerous online and web 2.0 technologies such as Videoant™, Turitin™ and RubiStar™ that can be used to facilitate CL tasks and give effective feedback.

According to Vaughan, Cleveland-Innes, and Garrison (2013:2) teaching presence can be defined as the "effort and activity around the design, facilitation, and direction of cognitive and social processes in learning communities for the purpose of realizing personally meaningful and educationally worthwhile learning". With this definition they advocate that teaching presence is not solely the responsibility of the facilitator but it should be distributed between all members of the learning community (Vaughn et al., 2013). When the roles and responsibilities are shared it could create a learning-centred environment that will ensure the

growth of both the learners and the facilitator (Vaughn et al., 2013). Alton-Lee (2003) agrees and add that the construction of new knowledge and understandings can grow out of these shared learning experiences.

### ***Motivation***

Students who are motivated take responsibility for their own learning (refer §2.5). Facilitators should continue to promote and encourage students' use of BL components (refer §3.4.4) and to engage and participate in CL activities. See §2.5.3 and Table 2.1 for the role of the facilitator in enhancing students' intrinsic motivation.

### ***Monitoring students***

As within the face-to-face CL classroom, in a BL environment facilitators should also systematically observe and collect data on the interaction and working of the group while conducting a task (refer §2.4.2.1). When needed, the facilitator intervenes to assist students in completing the task accurately and in working together effectively. The visibility of the facilitator promotes individual accountability (refer § 2.4.1.2). As seen in §2.4.2.1, students tend to feel accountable to be constructive if the facilitator observes the group. When facilitators ask the right questions on a discussion board, it can stimulate discussion and help students to think critically about certain aspects which will help refine their knowledge (refer §3.4.2). When facilitators participate in discussions, it provides opportunities and encourages students to engage with each other (refer §3.4.1). Facilitators should also give recognition of students' engagement and communicate with students who do not appear to be engaging (refer §3.4.4). The availability of student blogs and student progress in many LMSs provides facilitators with a good overview of who is falling behind or feeling isolated (refer §3.4.2).

### **3.7.4 Reviewing**

#### ***Peer, self and student reflection***

As seen in §2.5.6.6, reflection is a powerful pedagogical strategy that requires students to reflect on what they have learned and to share their reflections with their facilitators and fellow students (Picciano, 2009). It is also important for students to reflect and evaluate the task as such (refer §2.5.6.6). As seen in §3.5.4, feedback from students can be obtained by asking informal questions after an activity or students can fill in an online questionnaire at the end of the module. A discussion forum or wiki can be used to reflect, either as group exercises or for individual journaling activities. Group reflection allows students to compare their work with other students and think about the differences and similarities between them (refer §3.3.2). When students challenge each other's work and provide positive feedback, students facilitate each other's efforts to succeed through promotive interaction (refer §2.4.3.1). Facilitators should also reflect on their own teaching strategies by reviewing what worked and what did not work in a class (refer §2.4.2). Facilitators could also ask colleagues in the faculty to evaluate the resources, study material and class activities (refer §2.4.4).

### **3.7.5 Improving**

Feedback help facilitators to assess and reflect on their own teaching strategies in reviewing what worked and what did not work in a class (refer §2.4.2). Facilitators should take self,

student and peer evaluation into consideration and try to improve on the aspects that did not contribute to a better learning environment (refer §2.4.3).

### **3.8 CHAPTER SUMMARY**

In the previous chapter, the implementation of CL to improve IM was discussed for learning environments in general. The purpose of this chapter was to reach sub-aim (ii) how the CL can be implemented in a BL environment (§1.3). In order to reach this aim a study on BL was done. This chapter focused on the definition of BL. Various BL models and the classification of BL was discussed. From these models the researcher compiled a combined BL design model that consists of the following phases namely: planning, designing, implementing, reviewing and improving. Each of these phases were then discussed with regards to the implementation of CL to enhance intrinsic motivation.

## **CHAPTER 4**

# **THE IMPLEMENTATION OF COOPERATIVE LEARNING IN A BLENDED LEARNING ENVIRONMENT TO ENHANCE INTRINSIC MOTIVATION**

### **4.1 INTRODUCTION**

Chapter 3 focused on sub-aim (ii), to investigate how the implementation of cooperative learning (CL) can be adopted for a blended learning (BL) environment. A number of BL models were analysed to find a model that is suitable to integrate design principles focusing on CL. A combined BL design model was then proposed and used to discuss the design phases and a number of aspects to focus on when designing BL courses while integrating CL to enhance IM. The purpose of this chapter is to indicate how the above mentioned aspects were integrated and implemented in the module ECON 121. In §4.2 the background and module information of ECON 121 is given, and the intervention is discussed in §4.3. In §4.4 the technologies used are classified. Lastly, the way in which this design model was implemented in the module is demonstrated and categorised according to the design phases, namely planning (§4.5), design (§4.6), implementing (§4.7), reviewing (§4.8), and improving (§4.9).

### **4.2 BACKGROUND ON THE MODULE**

ECON 121 is a compulsory first year module within the faculty of economic and management sciences, the topic being an introduction to micro- and macroeconomics. About 1 500 students register for it each year and the module is taught by four different lecturers. The mode of delivery until the time of this study was strictly face-to-face and all the study material was available in paper-based formats.

### **4.3 THE INTERVENTION**

In 2014, ECON 121 was presented in a traditional face-to-face environment and the use of eFundiT<sup>TM</sup> and other online tools were limited to sending announcements and uploading Power Points. When planning the intervention, the facilitator therefore had to rethink the entire structure of the module, especially in terms of the integration of technology.

There are four groups of ECON students with a different facilitator assigned to each group. The intervention was implemented by one of the facilitators (experimental group), while the rest of the facilitators carried on as usual (control group). However, because of the way the course was structured, there were a few challenges regarding the intervention:

- The semester and final marks had to be calculated in exactly the same way for all the groups. Therefore, the group activities or exercises for the experimental group that were not part of the initial assessment plan could not count any marks towards the students' final marks for the module and they had to take part knowing that it was for personal gain only.
- Students were assigned to a specific group at the beginning of the semester, but it may occasionally have happened that some students attended classes in other groups. Due to the fact that the identified experimental group were the only students that had access to the collaborative online activities (refer §4.4.2) and were therefore the only students that received the complete intervention, the few students from the control groups that might have occasionally attended the experimental groups' classes would not have a significant effect on the research findings.

When planning the implementation and intervention for ECON 121, the combined BL design model (refer §3.4) was used as a guide to make sure all the necessary aspects were attended to. In this chapter, the implementation and intervention of the combined BL design model for ECON 121 is discussed according to the five design phases identified in the Chapter 3 (refer §3.7).

The intervention was divided into three main components, namely 1) the contact sessions, 2) the online team challenge and 3) the group task.

#### **4.3.1 The contact sessions**

During each contact session, the facilitator made use of CL techniques in class activities. These activities were done in informal groups and the students were allowed to choose their own group members. The class activities counted for 10% of the students' participation mark.

The facilitator was briefed by the researcher on how to incorporate the five elements of CL in the classroom and online learning environment and how to use face-to-face CL learning

strategies. An implementation guide (Addendum A) with basic CL information and techniques was also given to the facilitator.

#### **4.3.2 The online team challenge**

The online team challenge consisted of a number of team activities. Students were randomly divided into groups at the beginning of the semester and each received a job title. These groups stayed the same throughout the semester. Only the students identified as the experimental group were informed of these activities on the learning management system (LMS) and most of the activities had to be done online. All the activities were carefully structured and the students knew exactly what was expected from them at all times.

#### **4.3.3 The group task**

The group task was given to the students at the beginning of the semester. It counted for 20% of their participation mark and integrated all the work of the semester into a real life problem that they needed to solve. For this task, students could choose their group members, and they needed to meet face-to-face on more than one occasion to be able to complete the task.

### **4.4 CLASSIFICATION OF TECHNOLOGIES**

When planning a BL model, it is important for the facilitator to integrate a number of online and LMS tools that could assist in reaching the outcomes. As seen in §3.4.1 and §3.7, the facilitator should choose the technologies carefully to make sure that it enriches the learning experience. When not chosen carefully, technology can easily become a learning barrier, especially if the students are not competent or comfortable in using the technology (refer §3.4.1).

At the NWU, eFundiT<sup>™</sup>, an open-source system powered by SAKAI<sup>™</sup>, is used as the learning management system. Students are introduced to the system in their first year and they are generally very comfortable in using it. The basic functionalities of most of the well-known LMSs does not differ much. However, for this discussion, a list of functionalities of eFundiT<sup>™</sup> with a short description, available in SAKAI<sup>™</sup>, is given in Table 4.1.

**Table 4.1 LMS functionalities**

Functionality	Descriptions
Home	Viewing recent announcements, discussion and chat items
Announcements	Posting current, time-critical information
Assignments	Posting, submitting and grading assignment(s) online
Chat room	Real-time conversations in written form
Drop Box	Private file sharing between instructor and student
eGuide	Authoring, publishing and organising learning sequences
Forums	Forums and topics of a particular site
Glossary	Tool to create a glossary
Gradebook	Storing and computing assessment grades from tests & quizzes or grades that are manually entered
Messages	Messages to/from users of a particular site
Polls	Anonymous polls or voting
Resources	Posting documents, URLs to other websites, etc.
Schedule	Posting and viewing deadlines, events, etc.
Site info	Showing worksite information and site participants
Statistics	Showing site statistics by user, event or resource
Tests & Quizzes	Creating and taking online tests and quizzes
Web Content	Accessing an external website through the site
Wiki	Collaborative editing of pages and content

## 4.5 PLANNING

The first phase in redesigning ECON 121 involved planning. The discussion in §3.7.1 was summarised as Table 4.2 and used as a tool to plan the intervention.

**Table 4.2 Planning phase of the combined blended learning design model**

Planning				
Aims and objectives	Design principle	Implementation guideline	Proposed online or LMS tool	
	Alignment	To ensure that these three components of your course are aligned, ask yourself the following questions: <b>Learning objectives:</b> What do I want students to know when they leave this course? <b>Assessments:</b> What kind of tasks will reveal whether students have achieved the learning objectives I have identified? Instructional strategies: What kind of activities in and out of class will reinforce my learning objectives and prepare students for assessments?	Not applicable	
	Communicate module information	Communicate the module aims, goals, outcomes and assessment criteria with students. Assessment criteria for each task can be made available in the form of an announcement that goes out from the LMS or as part of the assignment so that students can be sure of exactly what are expected from them when completing the assignment or task.	Wiki page Announcement tool Assignment tool	
	Goal setting	Involve CL groups in setting goals or assessment criteria. A collaborative wiki page or a class discussion can be used to involve the students in planning and deciding upon learning aims and objectives.	Discussion forum Wiki page	
	CL group admin	Communicate group sizes (3-4 per group) for CL tasks		Announcement tool Class discussion
		Discuss the different roles such as reader, recorder, checker of understanding, encourager of participation, and elaborator of knowledge. Make sure students alter between these roles in the different CL tasks.		Announcement tool Discussion forum Wiki page
Communicate the importance of working together to the groups. The students should understand the importance of working together with regards to the five elements of CL (individual accountability, positive interdependence, social skills, group processing and promotive interaction).			Announcement tool Class discussion Discussion forum	

**Table 4.2 Planning phase of the combined blended learning design model (continue)**

PLANNING			
	Design principle	Implementation guideline	Proposed online or LMS tool
Content	Evaluate resources	Evaluate the academic quality of resources. Make sure all the online tools and resources are valid and reliable.	Not applicable
		Decide if resources are adequate for a BL and CL environment.	Google Scholar Resources folder Library website
	Availability of resources	Decide which resources should be made available and which resources students should find on their own.	Resources folder eGuide tool
		Identify multiple technologies or media to support a specific goal.	
		Where possible, substitute non-electronic resources with online resources.	
	Teaching strategies	CL strategies	Decide on the most appropriate CL teaching strategies. See Addendum A for CL strategies (Jigsaw, Think-pair-share, STAD, Group investigation).
Seek ways to modify and adopt the face-to-face strategies for a BL environment. Instead of giving time in class for discussions, set up a discussion forum or a wiki.			
Course management	Structure of activities	Structure and organise both face-to-face and online activities carefully through clear and specific instructions.	Assignment tool Announcement tool
	Student participation	Monitor student progress and participation by using the LMS. The facilitator can use the statistics tool to see which students do not visit the learning platform regular or participate in group discussions.	Wiki Discussion forum Statistics tool Grade book
	Class rules	Engage the CL groups to develop a set of rules for F2F and online activities	Discussion forum Class discussion Wiki

**Table 4.2 Planning phase of the combined blended learning design model (continue)**

PLANNING			
	Design principle	Implementation guideline	Proposed online or LMS tool
Student feedback	Feedback on teaching strategies	Use group and student feedback to improve teaching strategies and activities	Survey Monkey Fluid survey Online diary Wiki
	Feedback on tasks	Enable students to: <ul style="list-style-type: none"> <li>• reflect on and evaluate tasks</li> <li>• compare and challenge each other's work</li> <li>• provide feedback to each other</li> </ul>	Discussion forum survey
Student profile	Prior BL and CL experience	Establish the student's prior BL and CL experience	Discussion forum Survey Monkey Fluid survey Class discussion
	Accessibility	Find out if the specific technologies that you want them to use are accessible	Not applicable
	Skill level	Find out what their skill level and attitude is to use technology	Skills Test Discussion forum Survey Monk

As explained earlier, the researcher had to work within a course that was designed according to the requirements of the School of Economics, the economics curriculum and the assessment policy of the university. For this research, the researcher worked with the pre-designed learning objectives and assessments. The instructional strategies were adapted to some extent to incorporate a BL approach. The next section will focus on how each of the design principles in the planning phase were implemented in the ECON 121 module.

#### 4.5.1 Aims and objectives

##### *Alignment*

Assessment tasks and teaching strategies were planned in such a way that the learning aims and objectives could be reached by the students.

##### *Communicate module information*

As seen in Figure 4.1, the course aims were made available in the study guide that the students received at the beginning of the semester.

**MODULE OUTCOMES**

**After completion of this module you should be able to:**

- Demonstrate a sound knowledge of the concept microeconomics with reference to individual demand, individual supply, consumption and production, the relevant price elasticities and microeconomic equilibrium
- Analyse and apply the theory of production
- Analyse the behaviour of the principle economic agents such as consumers and producers
- Demonstrate a sound knowledge of the concept macro-economics, with regard to macro-supply, macro-demand and macro-economic equilibrium
- Posses knowledge of the Simple Macroeconomic Model and utilise it in economic analysis and predictions
- Show an understanding about how the government, through its economic policy, can influence major economic problems
- Explain the causes and suggest policy with regard to inflation, unemployment and economic growth
- Participate effectively in groups

**Figure 4.1 Course aims in study guide**

Learning outcomes were made available for each section of the work in the study guide (Figure 4.2) and as part of the eGuide on eFundi™ (Figure 4.3) that was developed before the contact sessions.



- After studying this study section, you should be able to:**
- Explain how changes in demand and/or supply will influence the equilibrium price and –quantities on the market and illustrate it graphically
  - Predict what the consequences will be when demand and supply changes simultaneously and illustrate it by means of graphs
  - Explain the interaction between markets and illustrate it graphically
  - Indicate what the effect of government interventions in the price mechanism, like setting prices for example, would be

**Figure 4.2 Learning outcomes in study guide**

**Outcomes**

**Define all concepts**

**Distinguish between concepts**

**Explain relationship between Production & Costs**

- ▣ Short run
- ▣ Long run

**Calculate and graph**

- ▣ TP, AP, MP,
- ▣ TC, AC, MC,
- ▣ TVC, TFC, AVC, AFC

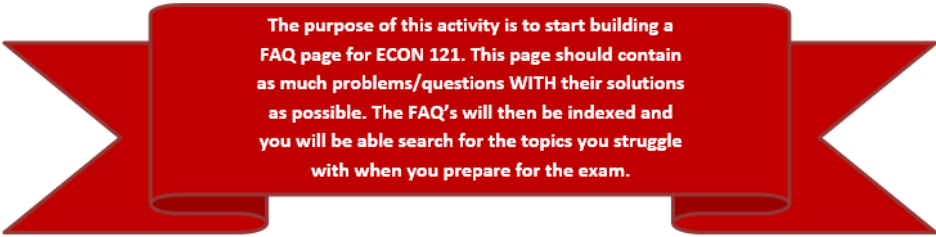
**Figure 4.3 Learning outcomes in e-Guide**

As seen in Figures 4.4, 4.5 and 4.6, the assignment instructions were made available in such a way that students could be sure of exactly what are expected from them when completing the assignment or task.

**Online Team Activity 3**

**Dear student**

I hope all of you are still well and up to date. We understand it is hard sometimes but please try to keep up. You and your fellow students will benefit **ALOT** from the next activity.



The purpose of this activity is to start building a FAQ page for ECON 121. This page should contain as much problems/questions WITH their solutions as possible. The FAQ's will then be indexed and you will be able search for the topics you struggle with when you prepare for the exam.

**Figure 4.4** Purpose of the assessment task

**Activity 3.1 (ALL TEAM MEMBERS)**  
As soon as you read this post, send a message to the **watsapp group** to confirm that you are on board and ready to partake in the activity. Use this whatsapp group to check up on one another and make sure no one is falling behind. **REMEMBER:** Your team depends on you...don't let them down!!!

**Activity 3.2 (ANALYST)**  
Create a sub-page on the FAQ's page. Change the page title to your team's name.  
Create 4 more subpages on your team's page. Name these pages CEO, ANALYTS, SECRETARY, PR MANAGER (Instructions in eGuide)

**Figure 4.5** Specific instructions for each team member

<b>SECRETARY</b>		<input checked="" type="checkbox"/>
<b>Activity 3.1</b>	Send a whatsapp <b>message</b> to the group to confirm that you're on board	
<b>Activity 3.3</b>	Post question / problem that you do not understand in the CEO page	
<b>Activity 3.4</b>	Help team members to find a suitable answer for their problems	
<b>Activity 3.5</b>	Submit your problem /question and the answer (if your group was able to solve it) to the form in the eGuide	
<b>Activity 3.6</b>	IF your team could not solve your problem, search for a solution in the FAQ page in the eGuide	
	If you can't find any answers related to your problem, submit your problem on the <b>PLEASE HELP</b> form in the eGuide	
<b>Activity 3.7</b>	Complete <b>Activity 3.7</b> in the eGuide	

**Figure 4.6 Self-evaluation checklist for each team member**

### ***Goal setting***

In the online team challenges and the CL activities in the contact session, the tasks were structured in such a way that a specific task or section of the task was assigned to a specific student. The researcher wanted to help the students realise that every student has a responsibility to the group and a specific task to fulfil as part of the final group task, especially through the way in which the activities for the online team challenge were structured. When the final team task was given to the students (refer §4.4.3), the group members were given the task as a whole and it was expected of them to set group goals from the given task and assign certain aspects of the task to certain group members to make sure that every group member do their part.

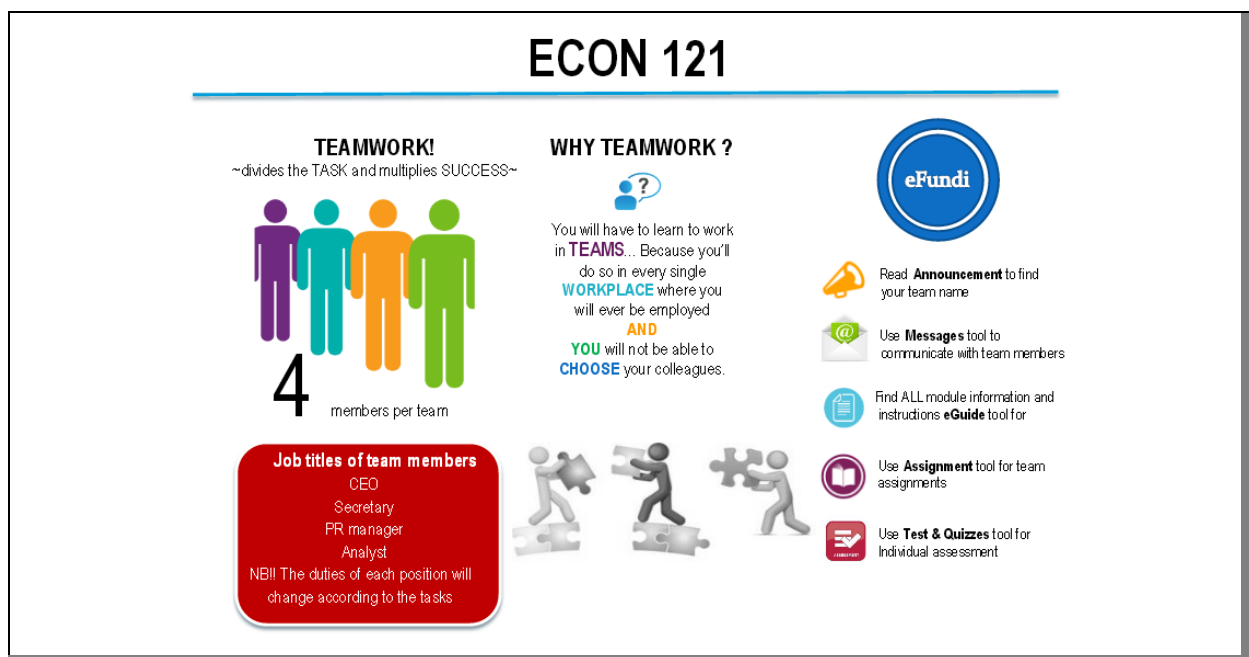
### ***CL group admin***

During the contact session, CL learning tasks were conducted to practice certain calculations of graphs. The facilitator expected the students to form groups of two or three students, depending on the task. Students were allowed to choose different team members for each contact session

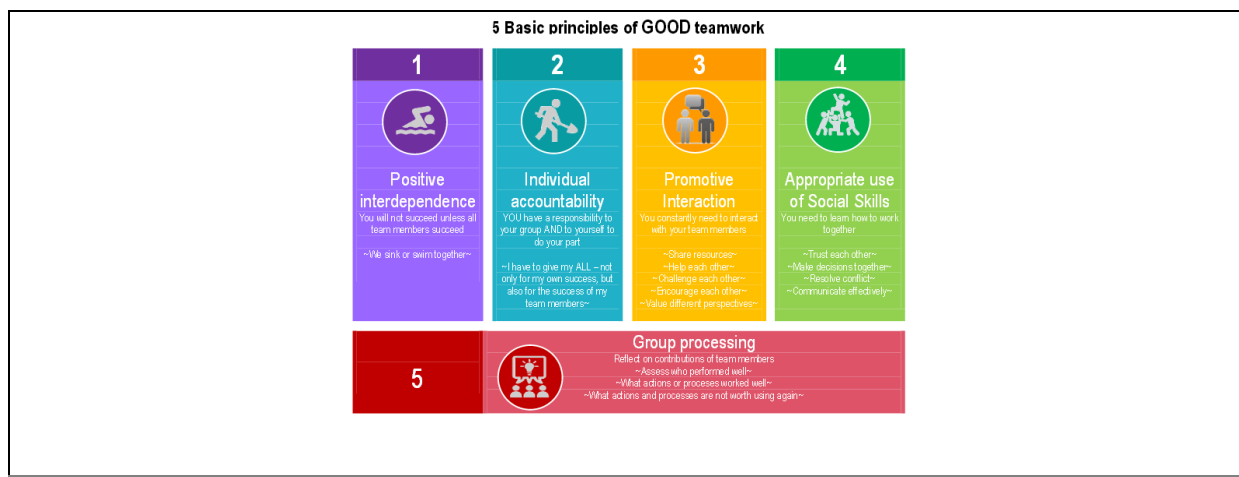
For the online team challenge, the students were randomly assigned into groups of four. An excel list with student numbers, names and job descriptions were made available on eFund<sup>i</sup>™. The first team task was to find their team members and make sure everybody is on board, as these groups would stay the same throughout the semester. Although there were

four job descriptions in each group (CEO, PR manager, secretary, analyst), the roles of each position changed for every task (Figure 4.5). A self-evaluation checklist (Figure 4.6) for each group member was given at the end of the task so that each group member could make sure they did exactly what was expected from them.

The students received an infographic about the structure of the team challenge (Figure 4.7), the basic principles of good teamwork (Figure 4.8) and the components of the team challenge (Figure 4.9) in the announcement tool on eFundi™ at the beginning of the semester. The facilitator also spent time in class to emphasise the value of team work, especially in the real world, and explained the structure of the tasks, what was expected of them and how the challenge would work. Because the students were not familiar with the concept of CL and the intervention were called the team challenge, the word *teamwork* was used to explain the elements and implementation of CL to the students to make it more applicable to their frame of reference.



**Figure 4.7 Structure of the team challenge**



**Figure 4.8 Basic principles of good teamwork**



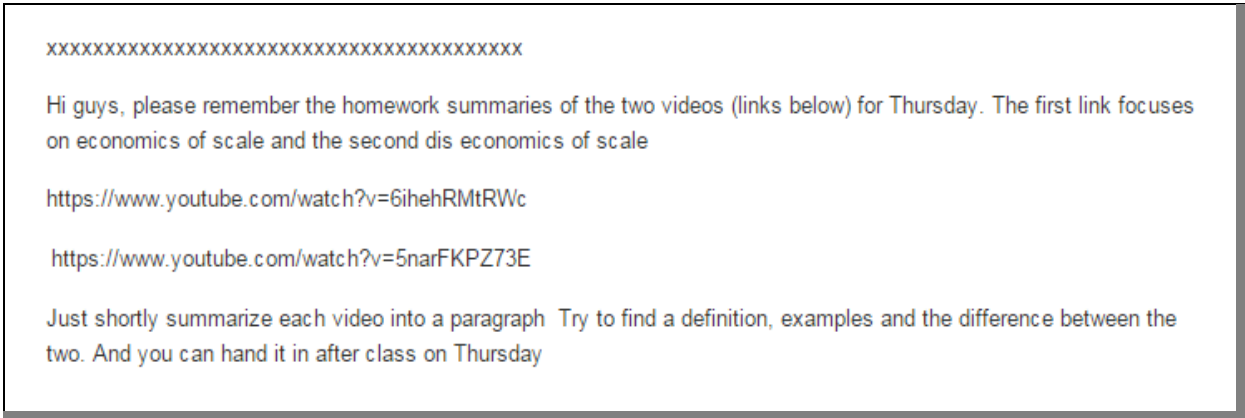
**Figure 4.9 Components of team challenge**

#### 4.5.2 Content

##### ***Evaluate resources***

The main resource for the module was a textbook chosen by the lecturers, which they regarded as most relevant and applicable for the focus and content of the module. The study guide was an additional resource developed by the lectures for learning guidance and support, and was available in hard copy and electronic format.





**Figure 4.12 Using other online recourses**

**4.5.3 Teaching strategies**

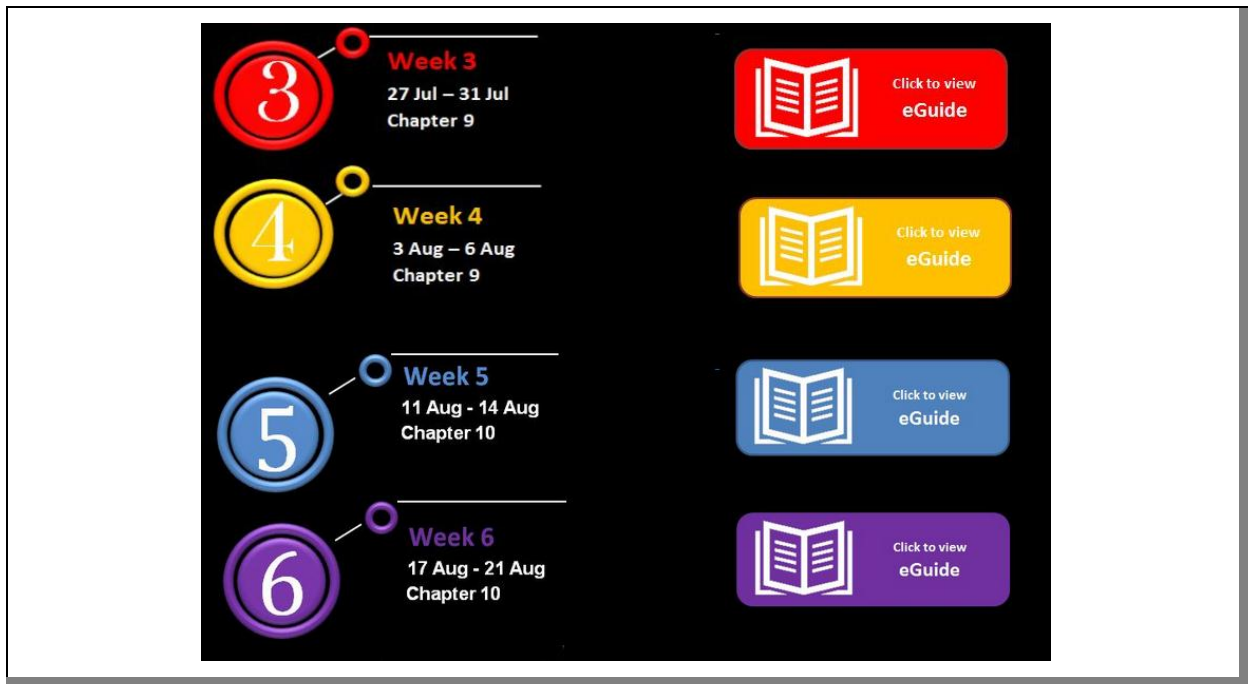
A number of CL strategies were suitable for the teaching and learning in the ECON 211 class. The CL strategy that was mostly used during the contact sessions were think-pair-share. During these activities, students were usually expected to do a calculation or to interpret a graph on their own. After they completed the task on their own, they should then compare their answers with their group members and the group should then decide which of the answers or calculations are correct and why.

In the online activities, the jigsaw, think-pare-share, student teams achievement divisions and group investigations were used. The online tasks (Addendum B) were structured in a way that these traditionally face-to-face activities could be executed in an online environment as well. The use of forums, WhatsApp groups and wiki pages were used to simulate the face-to-face interaction.

**4.5.4 Course management**

***Structure of activities***

The researcher and the facilitator had a standing appointment every week to discuss the activities for the week. The activities were properly planned and explained, and the students knew exactly what was expected of them. An e-guide divided into weeks (Figure 4.13) was constantly updated on eFundī™ and all the resources, instructions and activities were given to them in a structured way (Figure 4.14).



**Figure 4.13** E-guide divided into week

**Outcomes**

Graphs

- Market demand for firm's product
- TR & TC
- Firm's supply
- Abnormal profit/loss
- LT firm vs. sector

Tables


Concepts

- explain, discuss, define

**Read**


**Textbook: Chapter 10**

**Watch Video**




E9 Perfect Competition  
**EXAMPLE**

**Power point slides**


 [ECON 121\\_10 - Copy.ppt](#)

**Team Activity 2**


**Activity Instructions:**

 [Online Team Activity 2.pdf](#)


**Activity 2.2**

 [Elasticity Video's](#)

**Activity 2.7**

 [Mind Map](#)

**Activity 2.10**

 [Team Activity 2](#)

**Figure 4.14** Weekly structure of the e-guide

### ***Student participation***

Because of the large number of students, it was not possible for the facilitator to actively monitor all the students' individual participation in the online activities. The facilitator motivated the students during the contact sessions to participate and made them aware of the importance of the activities.

### ***Class rules***

During the first week of class, the facilitator led a general class discussion on the basic rules and good practices in CL. The students also received a guide with some important information (Figure 4.8) that they were asked to discuss in their groups.

### **4.5.5 Feedback**

#### ***Student feedback***

Students were expected to fill in a reflection form after each activity. Students were asked to reflect not only on the efforts of their team members, but also on the nature of the activity (Figure 4.15). The researcher and the facilitator took these comments in consideration when preparing the next activity.

The form is enclosed in a double-line border. It contains the following text and elements:

- Do you feel THIS ACTIVITY helped you to understand ELASTICITY better?**
  - YES!!
  - Some parts of it...
  - NO!!
- Do you feel YOUR TEAM helped you to understand ELASTICITY better?**
  - YES!!
  - Some parts of it...
  - NO!!
- Did you enjoy working in your team?**
  - YES!!
  - Some parts of it...
  - NO!!
- Any other comments:**

**Figure 4.15 Reflecting on the activity**

#### **4.5.6 Student profile**

##### ***Prior BL and CL experience***

ECON 121 is a first year module, and therefore the students could not have had much experience with either BL or CL in a tertiary environment. However, the students indicated that they were comfortable in using eFundi™ and therefore the researcher and the facilitator tried to design the activities in such a way that, where possible, the functionalities in eFundi™ were used.

##### ***Accessibility***

Only eFundi™ and some online tools were used in the activities. If a student had basic internet access, they were able to participate. All the students had full access to a number of computer labs and the library where they do have internet and eFundi™ access.

##### ***Skill level***

Students had completed their first semester at the university where they gained experience and developed their skills in the technology used for learning purposes. Because no advanced type of technologies was used in the intervention, the researcher and the facilitator did not find it necessary to set up a specific skills test.

#### **4.6 DESIGN**

Design is the second phase entered into when redesigning the ECON 121 module. From the discussion in §3.7.2, Table 4.3 were compiled as a summary and a tool to use for the intervention.

**Table 4.3 Design phase of the combined blended learning design model**

Design			
Design principle		Implementation guideline	Proposed online or LMS tool
Constructive alignment	Pedagogical objectives	Pedagogical objectives of a course should drive the learning outcomes and teaching-learning activities.	Not applicable
		Assessment tasks need to be aligned and correspond with each other.	Not applicable
Assessment	Assessment outcomes	Students should know exactly what is expected of them.	Announcement tool
	Assessment strategy	When CL tasks are assessed, students can in some cases be assessed individually for a specific task or section of the work.	Assignment tool Email Test & Quizzes tool
		Students can also be assessed on how well they functioned in the group.	
		Most CL techniques suggest a form of assessment that compliments the specific technique (Jigsaw, Think-pair-share, STAD, Group investigation). See implementation guide (Addendum A).	
		Rapid, comprehensive feedback should be given after each assessment task.	
	Technology integration	Make sure students know how to use the technologies used in the assessment task.	Assignment tool Announcement tool
	Technical support	Make sure students know where to go for technical support and assistance.	
	Submission of assessment	Make sure students know how the assessment task should be submitted.	
	Assessment criteria	Make sure students know how their work will be assessed. Provide a clear set of criteria and standards or a rubric.	

**Table 4.3 Design phase of the combined blended learning design model (continue)**

Design (continued)			
Design principle		Implementation guideline	Proposed online or LMS tool
Activities	Administrative aspects	<p>When designing CL tasks and activities, the facilitator should keep specific administrative aspects in mind, e.g.:</p> <ul style="list-style-type: none"> <li>• size and structure of the group</li> <li>• allocated time</li> <li>• layout of learning space</li> <li>• roles of group members</li> <li>• accessibility and distribution of relevant resources</li> </ul> <p>Define the purpose for the activity before deciding on a particular tool/application.</p>	Not applicable
	Mode of activity	<p>Decide if the task will be conducted in the face-to-face classroom, in the online environment or within a combination of the two.</p> <p>Student activity beyond the classroom should ideally involve a combination of both individual and collaborative activities, as well as both formal and supplementary activity and resources to support students in their learning and achievement of the course objectives.</p>	Not applicable
	Types of questions	<p>Use Bloom's revised taxonomy when designing learning tasks.</p> <p>See implementation guide (Addendum A).</p>	Not applicable
Workload	Student workload	<p>When designing a BL module, the workload should not exceed that of a traditional face-to-face course.</p> <p>Consider spending <i>less</i> time in class during contact sessions to allow students to spend more time in the online environment.</p>	Not applicable
Time spent	Time management	<p>Keep the time and effort for designing learning tasks and for students to complete tasks in proportion to their impact or importance in the course.</p>	Not applicable

#### **4.6.1 Constructive alignment**

The pedagogical aim of the tasks was always the first concern in designing the task. The resources and technologies that were chosen to help achieve these aims were carefully selected and incorporated afterwards. Where possible, the assessment tasks complemented each other. The online tasks and class activities were specifically chosen to better equip students for the exam, and the group task (Addendum E) integrated most of the other assessment tasks into one assignment.

#### **4.6.2 Assessment**

##### ***Assessment outcomes***

Students received an ECON 121 module policy document (Addendum C) at the beginning of the semester. This document indicated how their participation and final marks would be calculated and some other administrative arrangements concerning the module.

##### ***Assessment strategy***

The content of the module focus on the development of mathematical skills relevant to economical sciences. The assessment tasks were typically designed for the assessment of mathematical skills and therefore most of the assignments were in the form of a test with a memorandum. In some of the online tasks the students were required to submit some sections of the tasks as a group and some sections as individuals. Depending on the tasks, the students received immediate feedback on their submissions. In some cases their work was assessed by the LMS (Figure 2.16) and in other cases students received the memorandum automatically after submission for self-assessment. For the self-assessment, the students were asked to send their answers to a specified email address. An automated response was activated that sent a detailed memo back to those who submitted their answers. The students could then check and evaluate their work against the memo.

The campus cafeteria launches a special on Twisters by lowering the price from R24 to R18 with the result that the quantity of Twisters sold increase from 200 to 280. The floor manager notices that the sales of Chip-and-dip also increase from 120 units to 160 units. By applying the arc formula, calculate the cross-price elasticity of Chip-and-dip with respect to Twisters.

A. -1  
 B. 0  
 C. 1

Answer Key: A  
Correct Feedback:

**Well done!!**

Did you do it the same way as I did?

$$E_{xp} = \frac{\Delta Q}{\Delta P} \times \frac{\sum P}{\sum Q} \quad \text{Q of product A, Prices product B}$$

$$E_{xp} = \frac{40}{-6} \times \frac{42}{280}$$

$$E_{xp} = -1$$

Incorrect Feedback:

**Sorry you're wrong ;-)**

The correct answer is -1:

$$E_{xp} = \frac{\Delta Q}{\Delta P} \times \frac{\sum P}{\sum Q} \quad \text{Q of product A, Prices product B}$$

$$E_{xp} = \frac{40}{-6} \times \frac{42}{280}$$

$$E_{xp} = -1$$

**Figure 4.16** Example of automated LMS feedback

### ***Technology integration***

Students indicated that they were familiar with the use of eFund<sup>i</sup><sup>TM</sup>. Therefore, for the purpose of this module, the researcher and the facilitator tried only to use the technologies available in eFund<sup>i</sup><sup>TM</sup>. Where students were referred to other technologies, and for the more advanced or unfamiliar eFund<sup>i</sup><sup>TM</sup> functionalities, they received a detailed user guide to assist them (Addendum D).

### ***Technical support***

A dedicated email address was set up for the students. They could send any query regarding the team challenge to this address. If they had any eFund<sup>i</sup><sup>TM</sup> specific enquiries, the eFund<sup>i</sup><sup>TM</sup> helpline was able to assist them. They could also visit the IT walk-in service on campus if they had any other technical problems, e.g. unable to connect to the campus Wi-Fi.

### ***Submission of assessment***

Detailed instructions were given on the assignment (Addendum B) itself and the facilitator posted announcements on eFund<sup>i</sup><sup>TM</sup> to remind the students (Figure 4.17).

Remember that for the assignment you need to refer to sources that you used to help you with the assignment especially with question 3 as to where you found the data. Thus remember to reference all your sources. Just remember to be creative with the project and always support your opinions and answers with other resources. Remember to add a list of all group members to the front page. Note that the assignment must be handed in on Friday in E3-101A between 09:00-12:00 no excuses or exceptions

**Figure 4.17** Example of eFundiT<sup>TM</sup> reminder

### ***Assessment criteria***

Students received an assessment plan at the beginning of the module (Addendum C).

### **4.6.3** Activities

#### ***Administrative aspects***

The CL activities were carefully designed. For CL activities during the contact sessions, students could have chosen their own group members. Depending on the nature of the task, the facilitator would indicate how many students should form a group and what the role of each group member was. For the online challenge, students were divided into groups of four that were communicated to them in the announcement tool on eFundiT<sup>TM</sup>. For each activity there was a checklist of what was expected of each team member. The tasks were divided in such a way that each member has a specific role and had to contribute in their unique way to the final product. Students knew exactly what was expected of them and why the activity was important to complete (Addendum B).

#### ***Mode of activity***

For the purpose of this module, some of the CL activities took place during the contact session and others in the online environment. The online CL activities were not discussed in the classroom and students were expected to do it on their own in collaboration with their group members. Students received automated responses with detailed memorandums of the group tasks for self-assessment of the tasks or immediate feedback from the LMS if the task was done in the test and quizzes functionality (refer §4.6.2). Students were also expected to do some individual homework activities given to them during the contact sessions on their own time. The homework was mostly calculations and graphs from exercises in the textbook.

### ***Types of questions***

Bloom's revised taxonomy were kept in mind when designing the learning tasks and the formal examination. It ensured a variety of different tasks testing different levels of knowledge. Since this was a first year model, assessment tasks are expected by the university to test approximately 80% lower and 20% higher order cognitive skills. Therefore, the tasks and examination mostly focused on the bottom four levels of the taxonomy (remember, understand, apply and analyse) and not that much on the top levels (evaluate and create).

#### **4.6.4 Workload**

##### ***Student workload***

To accommodate the time that students had to work on the additional online activities, the facilitator provided students with extra time by using only one of the scheduled periods for formal teaching and giving the second double period (two hours) contact session for the online and homework activities. There were also two weeks where no formal face-to-face contact sessions were scheduled that the students could use to complete their final group task (refer §4.4.3).

##### ***Time management***

Because this approach to teaching and learning was a new experience both to the facilitator and the students, time definitely was a concern. The large number of students made it even more difficult to ensure everything was set up correctly and that the technologies could handle all the students and groups. However, when the facilitator gets used to integrating and facilitating CL in a BL environment, it will become easier to set up the activities.

## **4.7 IMPLEMENTING**

Implementing was the third phase in redesigning the ECON 121 module. From the discussion in §3.7.3, Table 4.4 was compiled as a summary and a tool to use in the practical implementation.

**Table 4.4 Implementing phase of the combined blended learning design model**

Implementing			
	Design principle	Implementation guideline	Proposed online or LMS tool
Technology	Technology choice	Make sure students know how various technologies work. Also make sure how those technologies can be used in a CL teaching and learning settings and if the chosen technology is suitable for a specific task. The facilitator should be competent in using the technologies to provide support for the students.	All tools
	Technology testing	The chosen technologies should be trialled and tested.	
Support	Student expectations	Provide good guidance to students in terms of: <ul style="list-style-type: none"> <li>• objectives</li> <li>• learning strategies</li> <li>• resources</li> <li>• evaluation criteria</li> <li>• their roles and what are expected of them during CL activities</li> </ul>	Assignment tool Announcement tool
	Student support	In blended courses and programmes, support might best be provided in a face-to-face mode. However, some online support can also be helpful.	Office hours Online chat room hours
	Technology incorporation	Facilitators should familiarise students with the use of technology by gradually integrating it into the module and tasks.	Video in resource folder
	Cooperative Learning	Guide students in the appropriate use of CL. Focusing on the following aspects: <ul style="list-style-type: none"> <li>• Group members should understand that the group has to take responsibility for and support each other.</li> <li>• Although each student still remains responsible for their own learning, promotive interaction cannot occur when students do not facilitate each other's efforts to succeed in the group's goal through supportive interaction.</li> </ul>	Announcement tool Wiki Discussion forum

**Table 4.4 Implementing phase of the combined blended learning design model (continue)**

Implementing (continued)			
Design principle		Implementation guideline	Proposed online or LMS tool
Course Orientation	Rationale	Explain the rationale for the different approach to the module. Help students to understand what blending learning is and why they would be required to sometimes work in collaborative groups.	Class discussion
	Skills development	Familiarise the students with process skills needed to complete specific tasks such as: <ul style="list-style-type: none"> <li>• reflection writing</li> <li>• conflict management</li> <li>• goal setting</li> <li>• social skills</li> </ul> Responsibilities of different role players should be built into assignments.	Online tutorials Assignments
Presence	Facilitators presence	Act as a mediator in CL activities.	Discussion forum Wiki Chat room File sharing
		Provide regular feedback by including the following: <ul style="list-style-type: none"> <li>• Interrupt discussions to introduce new ideas.</li> <li>• Enable students to post urgent questions and seek help from fellow students or the facilitator between contact classes.</li> </ul>	
		Be visible and facilitate the task, whether the tasks take place in the online environment or face to face.	
		Facilitate discourse that stimulates student engagement and interaction in scheduled activities to make sure that groups are functioning properly and stay on course.	

#### **4.7.1 Technology**

##### ***Technology choice***

The researcher tried not to introduce too many new technologies to the facilitator or the students. As seen in §4.6.2, eFundi™ were mostly used and both the facilitator and the students were familiar with the use of this LMS. Other technologies that were incorporated into the module were the use of email, basic browsing and searching the internet and simple online tools such as a mind map creator. Both the students and the facilitator indicated that they were comfortable in using these technologies. However, if anyone struggled at any time, support structures were in place (refer §4.6.2).

##### ***Technology testing***

The technologies used in this module are commonly used in other modules taken by the students. The researcher selected the technologies carefully and made sure that there would be no foreseen problems when the students had to make use of them.

#### **4.7.2 Support**

##### ***Student expectations***

As seen in §4.5.1, the learning outcomes and objectives were made available in the lesson functionality of the LMS. Assessment formed part of each activity and the activities were structured in such a way that students could be sure of exactly what was expected from them. The checklists for each activity (Addendum B) ensured that group members understood their specific roles to complete the task successfully

##### ***Student support***

One of the benefits of a blended course is the fact that the facilitator still spends face-to-face time with the students. The facilitator was able to support students who experienced difficulties during or after class, and regular office hours were scheduled. Therefore, most of the support was done in a face-to-face manner. However, the facilitator did schedule an online hour each week where students could ask questions in the chat functionality of eFundi™. The dedicated e-mail created for the course was also closely monitored by both the facilitator and the researcher, and other support structures as discussed in §4.6.2 were also in place.

### ***Technology incorporation***

At the beginning of the semester, only eFundi™ functionalities were used in the activities. Later on some other technologies like the use of email, basic browsing and searching the internet and simple online tools such as a mind map creator was incorporated. As seen in §4.7.1, the students were familiar with most of the technologies and detailed instructions were given on how to use the more unfamiliar ones.

### ***Cooperative learning***

During the introductory class discussion (refer §4.5), the facilitator explained the importance of CL to the students. They were made aware of the fact that although each student still remains responsible for their own learning, promotive interaction cannot occur when students do not facilitate each other's efforts to succeed in the group's goal through supportive interaction.

#### **4.7.3 Course orientation**

##### ***Rationale***

During the introductory class discussion (refer §4.5.1), the facilitator explained the benefits of CL and BL to the students. They had a discussion about the value of CL in any work environment and agreed that the new approach to the module will benefit them in many ways.

##### ***Skills development***

The facilitator used the CL activities during the contact session to gradually introduce students to CL and familiarise them with the social skills and work methods necessary to succeed in CL tasks. The facilitator focused on aspects such as goal setting, communication skills and division of responsibilities. Students were then expected to use these skills during the online activities.

#### **4.7.4 Presence**

##### ***Facilitator's presence***

During contact sessions the facilitator were visible and moved around between the groups. The facilitator monitored and stimulated group discussions, answered questions and gave

regular feedback to the students. The facilitator tried to introduce good CL practices during the contact sessions and hoped that it would roll over into the online CL environment.

Facilitator presence in the online environment was probably the most difficult of all the design principles to implement. The fact that there were 92 groups with four students per group taking part in the online challenge made it impossible to monitor and support all the groups online. Therefore, as seen in §4.7.2, most of the student support for the module was face-to-face, except for the online office hours in the chat tool of eFundi™ and the support email address. Because of the large number of CL groups, the facilitator was not able to partake or intervene in group discussions. The only way in which an online presence could be established was with the automated response memorandums and the immediate feedback from eFundi™ (refer §4.6.2).

#### **4.8 REVIEWING**

Reviewing was the third phase in redesigning the ECON 121 module. From the discussion in §3.7.4, Table 4.5 were compiled in summary and used as an implementation tool.

**Table 4.5      Reviewing phase of the combined blended learning design model**

Reviewing			
Design principle	Implementation guideline	Proposed online or LMS tool	
Reflection	<p>Students need to:</p> <ul style="list-style-type: none"> <li>• reflect on what they have learned</li> <li>• reflect and evaluate the task</li> <li>• share their reflections with their facilitators and fellow students</li> <li>• challenge each other's work and provide positive feedback</li> </ul> <p>Feedback from students can be obtained by asking informal questions after an activity or students can fill in an online questionnaire at the end of the module.</p> <p>A discussion forum or wiki can be used to reflect, either as group exercises or for individual journaling activities.</p> <p>Group reflection allows students to compare their work with the other students and think about the differences and similarities between them.</p> <p>Students facilitate each other's efforts to succeed through promotive interaction.</p>	Discussion forum Wiki	
	<p>Self-reflection</p>	<p>Facilitators should reflect on their own teaching strategies in reviewing what worked and what did not work in a class.</p>	Keep an electronic journal
	<p>Peer reflection</p>	<p>Facilitators could ask colleagues in the faculty to evaluate the resources, study material and class activities.</p>	

### ***Student reflection***

As seen in §4.5.5, students were expected to fill in a reflection form after each activity. Students were asked to reflect not only on the efforts of their team members but also on the nature of the activity.

### ***Self-reflection***

The researcher and facilitator had regular meetings where the student feedback and facilitator's experience on each of the activities were discussed. These were kept in mind when designing the activities to follow.

### ***Peer reflection***

The four lecturers involved with this module have regular subject meetings where teaching learning activities as well as the academic content of the module is discussed. The lecturer who implemented the online challenge also asked for input and suggestions from the other lecturers to design the online activities in the best possible way.

## **4.9 IMPROVING**

Improving is the last step in a design model. From the discussion in §3.7.5, Table 4.5 was compiled in summary as an implementation tool.

**Table 4.6 Improving phase of the combined blended learning design model**

<b>Improving</b>			
	<b>Guideline</b>	<b>Implementation</b>	<b>Proposed online or LMS tool</b>
<b>Improving</b>	Improving learning environment	Take the self, student and peer evaluation in consideration to improve on the aspects that didn't contribute to a better learning environment.	Not applicable

### ***Improving learning environment***

Throughout the duration of the course the researcher and facilitator took self, student and peer evaluation in consideration when designing the online and class activities. The facilitator

also reflected on her own teaching strategies in reviewing what worked and what did not work in a class.

#### **4.10 SUMMARY**

In the previous chapter a combined BL design model was proposed and the important design principles were identified and discussed. The purpose of this chapter was to indicate how each of the design principles (refer §3.7) of the combined BL design model should be applied when redesigning a module. The chapter started by giving the background and module information of ECON 121 (§4.2) and discussing the three aspect of the intervention, namely, the contact sessions, online group challenge and the group task (§4.3). The rest of the chapter were dedicated to the implementation of the intervention. Summary tables of the design principles identified in Chapter 3 were given. These tables, used as a guideline for each phase of the implementation, named the design principles, the guidelines on how to implement each design principle and possible online tools to use for the implementation. Following each table, the implementation of the design principles in ECON 121 as part of the intervention were discussed. To do so, the background and module information of ECON 121 were given in §4.2. The three aspect of the intervention, namely the contact sessions, online group challenge and the group task were discussed in §4.3. Lastly, the way in which this design model was implemented specifically in the ECON 121 was discussed in §4.4. The next chapter will focus on the research design and methodology of this study.

## **CHAPTER 5**

# **RESEARCH DESIGN AND METHODOLOGY**

### **5.1 INTRODUCTION**

This chapter discusses the research design and methodology used in this study the constructivist perspective employed and the mixed-method research approach used in the empirical study are addressed, and research methods, population and sampling, measuring instruments, data analysis, data collection procedures and ethical aspects are also discussed.

### **5.2 METHODOLOGY**

This study was performed from a constructivist perspective. Constructivism forms the basis of one of the major ways in which the world can be viewed. Constructivists believe that knowledge and meaning are constructed in the mind of the individual based on their context, previous experience and knowledge, attitudes, and beliefs (Cleland & Durning, 2015). According to Denzin and Lincoln (2011), the constructivist paradigm assumes relativist ontology and a subjectivist epistemology.

Ontology refers to a theory of existence. It is concerned with the nature of reality and of human beings (Lee, 2013). As mentioned, constructivism is based on relativist ontology. According to Levers (2013), relativist ontology is the belief that reality is a limited subjective experience and that nothing exists outside of our thoughts. Reality from a relativist perspective is not distinguishable from the subjective experience of it (Guba & Lincoln, 2005). With multiple interpretations of experience come multiple realities and therefore there are as many different realities as there are people. The purpose of science from the perspective of relativist ontology is to understand the subjective experience of reality and multiple truths (Levers, 2013). Constructivism is therefore based on the notion that the truth about “what is what” is socially negotiated.

According to Lee (2013), epistemology is a theory of knowledge that explores the relationship between the inquirer and the knowable, or between the knower and the respondent. In the subjectivist epistemology that constructivism endorses, the knower and the respondent co-creates understandings (Denzin & Lincoln, 2011). It also means the

researcher and the researched are inseparable. The researcher's beliefs, prejudices, experiences and values influence both what is studied and how the observations are seen (Cleland & Durning, 2015).

According to Clark (2006), when doing research from a constructivist perspective, the interest lies in the co-construction of knowledge between researchers and the researched. Clark (2006) further suggests that knowledge and interpretation in a constructivist research paradigm is the result of a collective process and three things must be attended to when recording the research namely:

- The assumptions researchers bring to their subject of inquiry and to the research situation;
- The socially constructed meanings that occur in the context of a particular interview;
- The socially constructed meanings that existed prior to, and shape or limit, the meanings that may emerge in a specific interview context.

Krauss (2005) asserts that when researchers interact with the subjects they study in order to obtain data, the inquiry changes both the researchers and the subject, making the knowledge context and time dependent. According to Kincheloe (2000), "the angle from which an entity is seen, the values of the researcher that shape the questions he or she asks about it, and what the researcher considers important, are all factors in the construction of knowledge about the phenomenon in question".

The central premise of mixed method design is that the use of quantitative and qualitative approaches in combination provides a better understanding of research issues than using either approach alone (Robins, Ware & Willing, 2008). In mixed method designs, qualitative methods are used to explore and obtain depth of understanding as to the reasons for success or failure to implement evidence-based practice or to identify strategies for facilitating implementation, while quantitative methods are used to test and confirm hypotheses based on an existing conceptual model and obtain breadth of understanding of predictors of successful implementation (Teddlie & Tashakkori, 2009). Ponterotto, Mathew and Raugley (2013) argue that a mixed-method research design allows words to add meaning to numbers. By using this research design, more reliable evidence can be obtained, and it is possible to provide better conclusions through correlation and verification of findings.

When using a mixed-methods research design, a combination of qualitative and quantitative methods is used and researchers are therefore not limited to techniques associated with only one of the traditional designs (McMillan and Schumacher, 2010). This research method does not replace either the quantitative or qualitative approaches, but rather uses the strengths and minimises the weaknesses of both (Ponterotto et al., 2013). Cameron (2009) argues that when using data from both quantitative and qualitative approaches, the researcher gains a deeper understanding of the phenomenon. When a combination of research approaches is used, it can add insight and understanding to aspects that might be missed when only a single method is used. It therefore produces more complete knowledge necessary to connect theory and practice (Cameron, 2009).

The mixed-method design of choice for this study, which allowed for legitimate, valid and reliable data, was the sequential explanatory mixed method design (QUAN→qual). According to Fraenkel, Wallen and Hyun (2012), this design is characterised by data that are collected and analysed in two phases. The quantitative data are gathered and analysed in the first phase of the research (Creswell & Plano Clark, 2011). During this phase, the researcher identifies specific quantitative results that call for additional explanation (Creswell & Plano Clark, 2011). The second phase focuses on the qualitative data (Creswell, 2009). During this phase, the researcher develops or refines the qualitative research questions, the sampling procedures and data collection protocol (Creswell & Plano Clark, 2011). Thereafter the qualitative data are collected and analysed and the researcher interprets to what extent the qualitative results can add insight into the quantitative results (Fraenkel et al., 2012). The purpose of the explanatory mixed method design is to use qualitative findings to help clarify the quantitative results by collecting and analysing follow-up qualitative data (Ivankova et al., 2010) and therefore these two forms of data are separate but connected (Creswell, 2009). The advantage of the explanatory mixed method design is that the data is gathered in two clearly separate stages which makes it straightforward to implement (Ivankova et al., 2010). The sequential flows of the quantitative and qualitative phases are shown in Figure 5.1.



**Figure 5.1 Explanatory mixed method design**

### **5.3 RESEARCH CONTEXT AND PARTICIPANTS**

This study was conducted at the North-West University, Potchefstroom campus, South Africa. Participants were selected by means of convenience sampling. According to Mitchell and Jolley (2013), convenience sampling is a sampling method where a group of subjects is selected on the basis of being available. The participants for this study were all the students enrolled for ECON 121 in 2014 and ECON 121 in 2015. ECON 121 is a compulsory first year economics module for all BCom students. There are about 1400 students who enrol for this module each year.

Because of the large number of students enrolled for the ECON 121 module, there are four lecturers responsible for a specific group of enrolled students. The students are divided into different groups according to their curriculum codes. For the purpose of this study, the researcher only corresponded with one of the lecturers for this module, Lecturer A. The intervention was implemented in 2015 on the group of students assigned to Lecturer A. All the students from 2014 and the students assigned to the other three lecturers in 2015 acted as a control group.

The participants for the quantitative research were divided into the following groups:

Control group:

- Group C1: Students enrolled for ECON 121 in 2014 who attended Lecturer A's classes

Group C2: The rest of the students enrolled for ECON 121 in 2014

Group C3: Students enrolled for ECON 121 in 2015 who were not in Lecturer A's classes

Experimental group:

Group E1: Students enrolled for ECON 121 in 2015 who attended Lecturer A's classes

## **5.4 QUANTITATIVE RESEARCH**

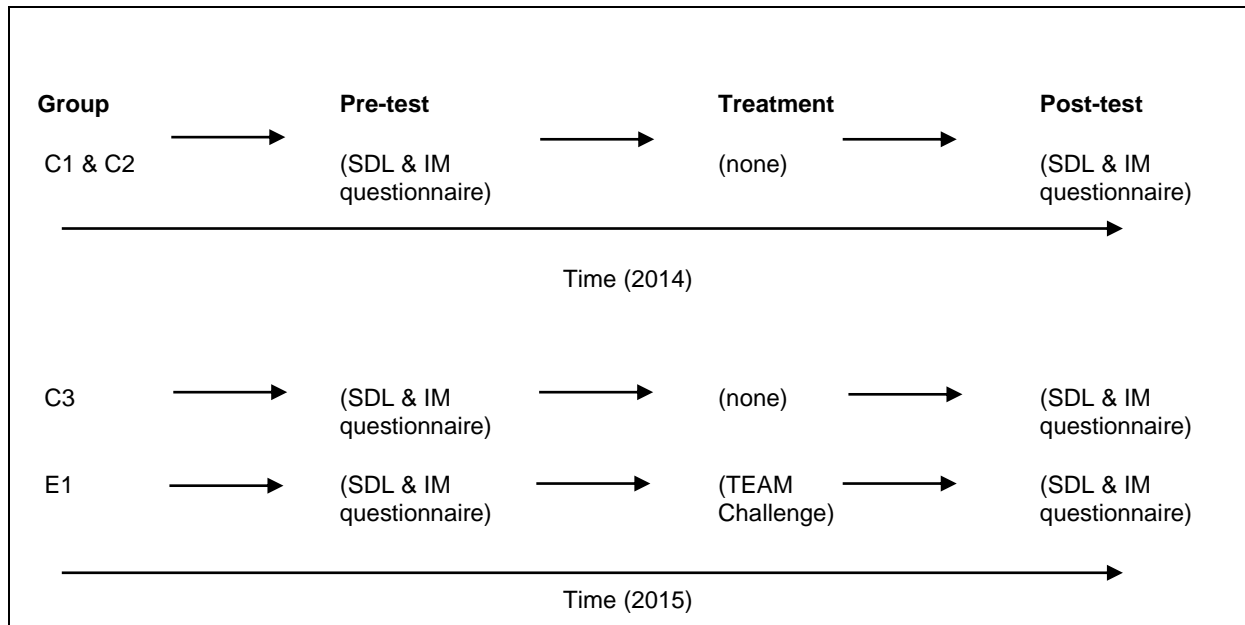
In the next section the quantitative component of this study will be discussed. The discussion will focus on the research design (§5.4.1), participants (§5.4.2), measuring instruments (§5.4.3), data collection procedure (§5.4.4), and the data analysis (§5.4.5).

### **5.4.1 Research design**

Maree and Pietersen (2010) describe quantitative research as a process that is systematic and objective in its ways of using numerical data from a selected population to generalise the finding that is being studied. Data are analysed based on the type of questions and by using the appropriate statistical tests (Cresswell & Plano-Clark, 2011). One of the ways in which quantitative research can be conducted is called quasi- experimental design. Quasi-experimental research shares similarities with traditional experimental design or randomized controlled trial, but it specifically lacks the element of random assignment to treatment or control (McMillan & Schumacher, 2006). As with experimental design, in quasi-experimental design the impact of an intervention on participants in a certain study is determined by the researcher (Cresswell, 2014). Thus, the researcher manipulates what the participants will experience by means of an intervention (McMillan & Schumacher, 2006). In this study, the intervention was the redesigning of the ECON 121 module into a blended learning (BL) environment with a specific focus on cooperative learning (CL) to promote intrinsic motivation (IM). The students in the experimental group had to participate in the team challenge that was discussed in Chapter 4.

The specific kind of experimental design used for this study is called the quasi-experimental design. The purpose of this method is to determine cause and effect when there is manipulation of conditions (Cresswell, 2014). Like true experiments, quasi-experiments involve administering a treatment of some kind, but the participants are not randomly

assigned to the treatment (refer 5.3). There are a number of different quasi-experimental designs available; however, the nature of this study favours a non-equivalent groups, pre-test, post-test control group design. Figure 5.4 shows a graphic representation of the design. According to McMillan & Schumacher (2006), in a non-equivalent groups, pre-test, post-test, control group design, the researcher uses intact, already-established groups of subjects, gives a pre-test, administers a treatment (intervention) to one group, and gives a post-test. Figure 5.2 shows the design customised for this specific study.



**Figure 5.2 Customised non-equivalent groups pre-test-post-test control group design**

### 5.4.2 Participants

A non-equivalent groups, pre-test, post-test, control and comparison design allows the researcher to conduct research on previously established groups (Tuckman & Harper, 2012). The control as well as the experimental group were subjected to a pre-test, after which only the experimental group received an intervention that attempted to enhance IM. The post-test was again administered to both groups. The study was conducted over two years. The students who enrolled for ECON 121 in 2014 and the group of who was assigned to lecturer B and lecturer C in 2015 were selected as the control group. The students for ECON 121 in 2015 who was assigned to Lecturer A formed the experimental group. Since the two groups came from different cohorts, which could influence both the validity and the reliability of the

research negatively, compensation was built into the design in the form of inferential statistics and control variables:

- Inferential statistics, e.g. ANCOVA, was performed to partial-out the effect of differences between the two groups from different years.
- To ensure as much similarity as possible between the two groups participating in the research, the questionnaire and interviews for both cohorts were conducted during the same semester of both years, Namely the second, ensuring that students had similar average ages, identical study guides and outcomes, equal hours of contact time, and the same group of lecturers conducting the classes.

### **5.4.3 Measuring instruments**

The quantitative data for this study were collected by questionnaires. The respondents in the study were asked to complete two questionnaires.

The first questionnaire that was used in this study was based on the self-directed learning instrument (SDLI) (Cheng et al., 2010). The questionnaire was published in the journal: *International Journal of Nursing Studies*, vol 47. The questionnaire consists of 20 items and is scored on a five-point Likert scale (5-Strongly agree / 4-Agree / 3-Neutral / 2-Disagree / 1-Strongly disagree). The 20 items are divided into four domains, namely: learning motivation (6 items), planning and implementing (6 items), self-monitoring (4 items), and interpersonal communication (4 items). The SDLI questionnaire was originally developed for nursing students; however, the questions do not focus specifically on the nursing environment and can be used in any context. Aside from a number of studies in the nursing environment (Vess, 2015), the SDLI was also used in the fields of problem-based learning (Ali, Gameel & Sebai, 2010), English language (Wichadee, 2011), e-learning (Carson, 2012) and team-based learning (Cheng, Liou, Hsu, Pan, Liu & Chang, 2014). Shen, Cheng and Hu (2014) did a study to confirm the validity and reliability of the SDLI. From this study, the exploratory factor analysis identified a four-factor structure, accounting for 56.101% of the total variance. The confirmatory factor analysis showed a good overall fit of this four-factor model. Cronbach's alpha for internal consistency of overall scale was 0.916, and four dimensions were between 0.755-0.825. Therefore, according to Shen et al., (2014), their study indicated that the SDLI is a valid and reliable instrument for assessing self-directed learning (SDL).

The second questionnaire used was the intrinsic motivation inventory (IMI) (Ryan, 1982). This questionnaire was published in the journal: *Journal of Personality and Social*

Psychology, vol 42. The questionnaire consists of 45 questions and is scored on a seven-point Likert scale. The instrument assesses respondents' interest/enjoyment, perceived competence, effort, value/usefulness, felt pressure and tension, relatedness, and perceived choice while performing a given activity, thus yielding six subscale scores. The IMI consists of varied numbers of items from these subscales, all of which have been shown to be factor analytically coherent and stable across a variety of tasks, conditions and settings. Ryan (1982) suggest that, depending on the study, certain subscales can be used or excluded. Therefore it is recommended that investigators perform their own factor analyses on new data sets. The general criteria for inclusion of items on subscales have been a factor loading of at least 0.6 on the appropriate subscale, and no cross loadings above 0.4. Typically, loadings substantially exceed these criteria. For the purpose of this study, the validity and reliability of the questionnaire were determined as discussed in the Chapter 6. The IMI has been used in several experiments related to intrinsic motivation (IM) e.g. first language (Monteiro, Mata & Peixoto, 2015); sport psychology (Tenenbaum & Eklund, 2008); schizophrenia (Choi & Medalia, 2010); mathematics education (Monteiro et al, 2015), and information and communication technology literacy (Leng, Ali, Baki & Mahmud, 2010).

#### **5.4.4 Data collection procedure**

As seen above, the quantitative data were collected with the use of the SDLR and the IMI. Both these questionnaires were set up in Fluid Survey™ and the links were made available on eFundi™ which allowed students to complete it online.

##### Group C1 and Group C2

- Students completed the online questionnaires when the module started at the beginning of the second semester in 2014 (pre-test).
- Students followed the course of the module throughout the semester, presented by Lecturers A-D, as is usually the case.
- Students completed the same questionnaires on conclusion of the module (post-test).

##### Group C3

- Students completed the online questionnaires when the module started at the beginning of the second semester in 2015 (pre-test).

- Students followed the course of the module throughout the semester, presented by Lecturers B-D, as is usually the case.
- Students completed the same questionnaires on conclusion of the module (post-test).

#### Group E1

- Students completed the online questionnaires when the module started at the beginning of the second semester in 2015 (pre-test).
- Students followed the course of the module during which they underwent an intervention in the form of a newly designed BL module with the focus on cooperative learning (CL) to enhance IM. The module was presented by Lecturer A.
- Students completed the same questionnaires at the end of the module (post-test).

The researcher exported the data from Fluid Survey for statistical analysis. The number of completed questionnaires is presented in Table 5.1.

**Table 5.1 Number of completed questionnaires**

Group	Possible participants	Participants who completed pre-test	Participants who completed post-test	Participants who completed both
C1	782	587	356	107
C2	179	79	139	42
C3	985	452	549	257
E1	379	124	255	124

Of all the completed questionnaires, the responses of only 149 participants in 2014 and 381 participants in 2015 could be used for statistical analysis. The reasons that such a small percentage of the data could be used for statistical analysis is because (a) the participants only completed either the pre- or the post-test questionnaire and therefore they could not be used for comparison; and (b) completion of the questionnaires were totally voluntary and students were not penalised in any way if they did not complete both the questionnaires.

## **5.4.5 Data analysis**

The data gathered from the questionnaires used for this study were processed and analysed with the help of the Statistical Consultation Services of the North-West University.

### **5.4.5.1 Validity**

In the context of research design, the term *validity* refers to the degree to which scientific explanations of phenomena match reality (McMillan & Schumacher, 2006). It therefore verifies the truthfulness of the findings and conclusions. According to Creswell and Plano Clark (2011), there are two levels of concerns about validity: a) the quality of the scores from the instrument used, and b) the quality of the conclusions that can be drawn from the results of the quantitative analysis. Quantitative validity therefore means that the scores received from the participants are meaningful indicators of the construct that is being measured (Creswell & Plano Clark, 2011).

As indicated in §5.4.3, two questionnaires were used: one for measuring the students' SDL skills and another for measuring their IM. A confirmatory factor analysis (CFA) using the AMOS version 22 statistical package was done. A CFA is a theory-testing model where the covariance matrix of the sample data is compared with the theoretical structure of the instruments. According to Brown (2013), this model provides a viable method for evaluating construct validity and it tests the hypothesis concerning the factor structure of a measuring instrument. The CFA, consisting of regression weights, correlations between constructs and fit indices, was done to test whether the study population's data are consistent with the model recommended by the designers of the questionnaires. Regression weights are a statistical measure that attempts to determine the strength of the relationship between a factor and its underlying items. Correlations refer to the strengths of relationships between factors. These correlations are interpreted according to Cohen's guidelines, namely, small (0.1), medium (0.3) and large (0.5). Lastly, the fit indices determine how well the model fits, referred to as fit statistics. The goodness-of-fit of a specific model can be determined by a number of statistical measures. According to Hancock and Mueller (2010), it is considered good practice to report multiple fit indices from three broad classes. For the purpose of this study, the minimum sample discrepancy divided by degrees of freedom (CMIN/DF), comparative fit index (CFI) and root mean square error of approximation (RMSEA) will be reported. The acceptable values for a good fit are shown in Table 5.2.

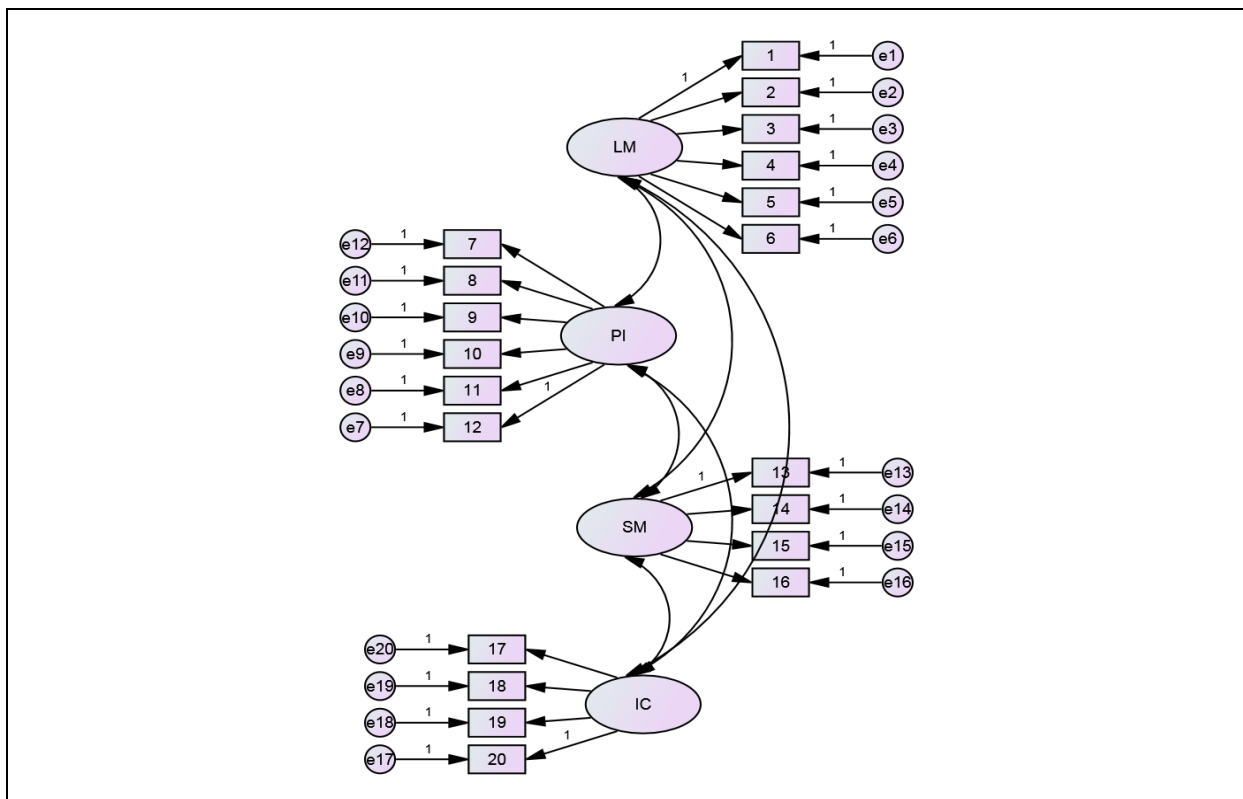
**Table 5.2 Acceptable values for goodness of fit indices (Hancock and Mueller, 2010:185)**

Indices	Acceptable value
CMIN/DF	≈ 2 - 5
CFI	> 0.9
RMSEA	< 0.08

The results from the CFA for both the IM and SDL questionnaires will be discussed in the following paragraphs.

***SDLI questionnaire***

Figure 5.3 gives a visual representation of the relationships between the factors and the underlying questions of the SDLI questionnaire. The figure shows the relationship between the four factors of SDL, namely: learning motivation (LM), planning and implementing (PI), self-monitoring (SM) and interpersonal communication (IC). The figure further shows the relationship between the questions (1-20) and each of the factors it belonging to (refer §5.4.3). The circles (e1-e20) indicate the measurement error of each question.



**Figure 5.3. Relationships between the factors and the questions of the SDLI questionnaire**

The standardised regression weights for the SDLI questionnaire are given in Table 5.3.

**Table 5.3 Standardised regression weights of the SDLI factors**

			Estimate	P
Question 1	-->	Learning motivation	0.485	***
Question 2	-->	Learning motivation	0.530	***
Question 3	-->	Learning motivation	0.540	***
Question 4	-->	Learning motivation	0.587	***
Question 5	-->	Learning motivation	0.521	***
Question 6	-->	Learning motivation	0.661	***
Question 7	-->	Planning and implementing	0.561	***
Question 8	-->	Planning and implementing	0.705	***
Question 9	-->	Planning and implementing	0.654	***
Question 10	-->	Planning and implementing	0.670	***
Question 11	-->	Planning and implementing	0.668	***
Question 12	-->	Planning and implementing	0.688	***
Question 13	-->	Self-monitoring	0.573	***
Question 14	-->	Self-monitoring	0.672	***
Question 15	-->	Self-monitoring	0.762	***
Question 16	-->	Self-monitoring	0.671	***
Question 17	-->	Interpersonal communication	0.631	***
Question 18	-->	Interpersonal communication	0.615	***
Question 19	-->	Interpersonal communication	0.388	***
Question 20	-->	Interpersonal communication	0.491	***

\*\*\* p<0.001

It was found that all the regression weights for these factors were statistically significant with a p-value < 0.001 and the estimate above 0.485. Therefore, the correlation between the questions and the SDL factor it belongs to was large.

Correlations refer to the strengths of relationships between factors (refer §5.4.5.1). The correlation coefficient between the factors for the SDLI questionnaire used in this study is presented in Table 5.4.

**Table 5.4 Correlation coefficients of the SDLI factors**

			<b>Estimate</b>	<b>P</b>
Learning motivation	<-->	Planning and implementing	0.789	***
Learning motivation	<-->	Self-monitoring	0.731	***
Learning motivation	<-->	Interpersonal communication	0.696	***
Planning and implementing	<-->	Self-monitoring	0.869	***
Planning and implementing	<-->	Interpersonal communication	0.677	***
Interpersonal communication	<-->	Self-monitoring	0.806	***

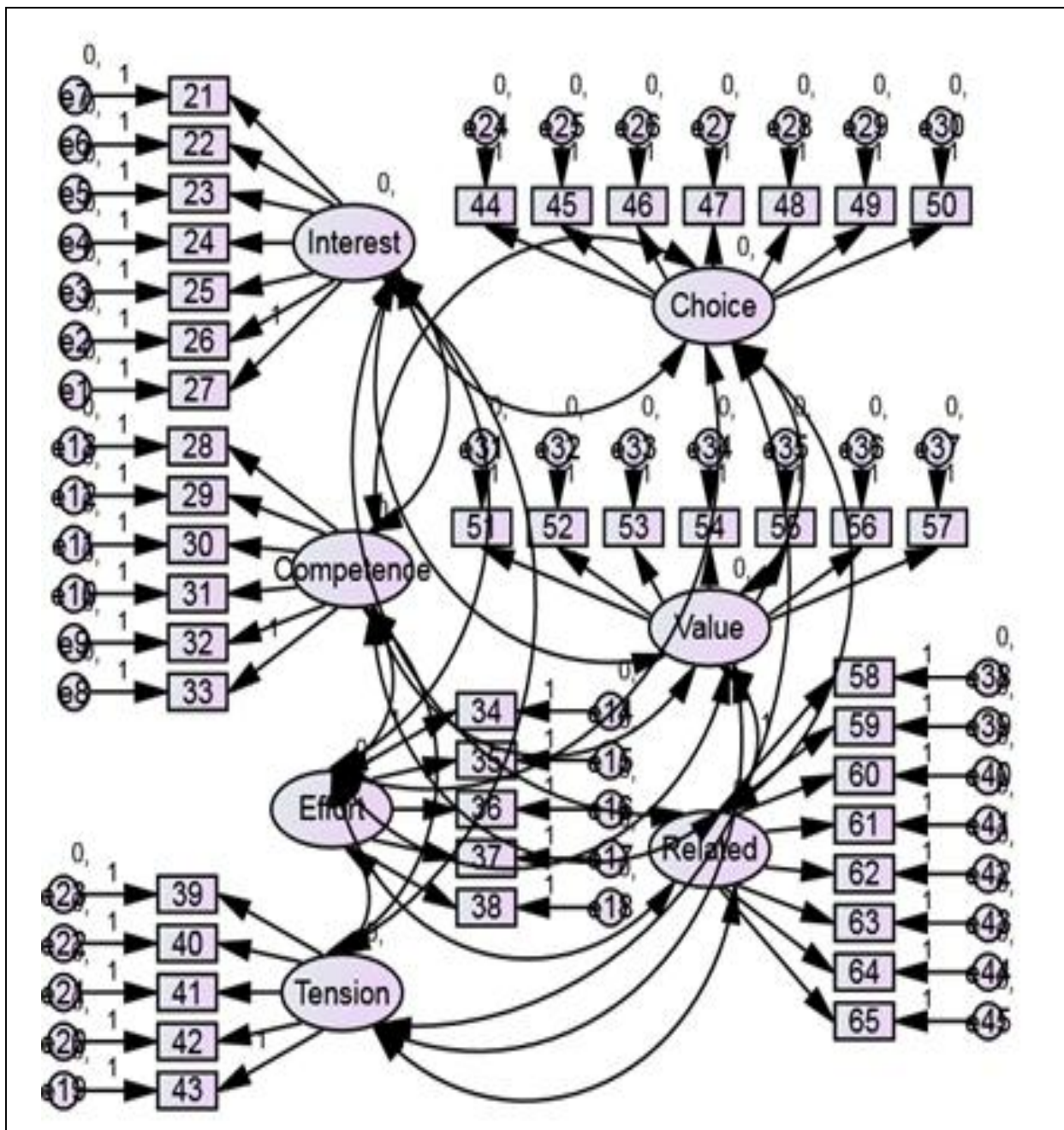
\*\*\* p<0.001

From Table 5.4 it is evident that the correlation coefficient between all four factors was above 0.5, which indicates that there was a high positive correlation between the factors. The four factors in the questionnaire used for this study had a strong relationship as could be expected of the factors measuring aspects of SDL, indicating that only reporting the total SDL score instead of the sub scores is viable.

The goodness-of-fit statistics were calculated between the specified covariance model and that of the data for the questionnaire used in this study. The four-factor model yielded a relatively high minimum sample discrepancy divided by degrees of freedom (CMIN/DF) of 5.266. The reason for this value to be somewhat high might be the large dataset (n=1277) used for these tests. An acceptable CFI of 0.911 was found for the four-factor model while the root mean square error of approximation (RMSEA) value of 0.062 with a 90 % confidence interval of [0.057; 0.062] was good. Even though the CMIN/DF value of this four-factor model was found to be higher than 5, the rest of the goodness-of-fit test was in the required range. It can be assumed that the construct validity of the SDL questionnaire used in this study is satisfactory. Because of the high correlation between the factors, the data throughout this chapter will be discussed with regard to the students' scores in SDL as a whole, and not for each of the four factors respectively. In the next section validity of the IMI questionnaire will be discussed.

### IMI questionnaire

The IMI questionnaire consists of seven factors, namely (a) interest/enjoyment, (b) perceived competence, (c) effort, (d) value/usefulness, (e) pressure and tension, (f) relatedness and (g) perceived choice. Figure 5.4 gives a visual representation of the relationships between the factors and the questions of the IMI questionnaire. The figure shows the relationship between the seven factors of IM and the relationship between the questions (1-65) and each of the factors it belongs to (refer §5.4.3). The circles (e1-e65) indicate the measurement error of each question.



**Figure 5.4. Relationships between the factors and the questions of the IMI questionnaire**

The standardised regression weights for the IMI questionnaire is given in Table 5.5.

**Table 5.5 Standardised regression weights of the IMI factors**

			<b>Estimate</b>	<b>P</b>
Question 15	-->	Interest/enjoyment	0.739	***
Question 14	-->	Interest/enjoyment	0.819	***
Question 13	-->	Interest/enjoyment	0.826	***
Question 12	-->	Interest/enjoyment	0.499	***
Question 11	-->	Interest/enjoyment	0.535	***
Question 10	-->	Interest/enjoyment	0.889	***
Question 09	-->	Interest/enjoyment	0.880	***
Question 21	-->	Perceived competence	0.372	***
Question 20	-->	Perceived competence	0.861	***
Question 19	-->	Perceived competence	0.774	***
Question 18	-->	Perceived competence	0.748	***
Question 17	-->	Perceived competence	0.716	***
Question 16	-->	Perceived competence	0.840	***
Question 22	-->	Effort	0.785	***
Question 23	-->	Effort	0.490	***
Question 24	-->	Effort	0.752	***
Question 25	-->	Effort	0.489	***
Question 26	-->	Effort	0.510	***
Question 31	-->	Pressure and tension	0.693	***
Question 30	-->	Pressure and tension	0.705	***
Question 29	-->	Pressure and tension	0.667	***
Question 28	-->	Pressure and tension	0.664	***
Question 27	-->	Pressure and tension	0.517	***
Question 32	-->	Perceived choice	0.562	***
Question 33	-->	Perceived choice	0.649	***
Question 34	-->	Perceived choice	0.772	***
Question 35	-->	Perceived choice	0.290	***
Question 36	-->	Perceived choice	0.824	***
Question 37	-->	Perceived choice	0.527	***
Question 38	-->	Perceived choice	0.522	***
Question 39	-->	Value/usefulness	0.839	***
Question 40	-->	Value/usefulness	0.842	***
Question 41	-->	Value/usefulness	0.818	***
Question 42	-->	Value/usefulness	0.744	***
Question 43	-->	Value/usefulness	0.671	***

			Estimate	P
Question 44	-->	Value/usefulness	0.852	***
Question 45	-->	Value/usefulness	0.816	***
Question 46	-->	Relatedness	0.665	***
Question 47	-->	Relatedness	0.793	***

**Table 5.5 Standardised regression weights of the IMI factors (continue)**

			Estimate	P
Question 48	-->	Relatedness	0.499	***
Question 49	-->	Relatedness	0.251	***
Question 50	-->	Relatedness	0.518	***
Question 51	-->	Relatedness	0.693	***
Question 53	-->	Relatedness	0.495	***

\*\*\*  $p < 0.001$

It was found that all the regression weights for these factors were statistically significant with a p-value  $< 0.001$  and the estimate above 0.37, except for questions 35 and 49 with standardised regression weights of 0.29 and 0.25. A possible reason for the low regression weights of these questions might be that the students did not understand the question properly. The correlation coefficient of the factors for the questionnaire used in this study is presented in Table 5.6.

**Table 5.6 Correlation coefficients of the IMI factors**

			Estimate	P
Interest/enjoyment	<-->	Competence	0.652	***
Interest/enjoyment	<-->	Effort	0.615	***
Interest/enjoyment	<-->	Pressure and tension	-0.390	***
Interest/enjoyment	<-->	Perceived choice	0.432	***
Interest/enjoyment	<-->	Value/usefulness	0.631	***
Relatedness	<-->	Interest/enjoyment	0.243	***
Competence	<-->	Perceived choice	0.263	***
Competence	<-->	Effort	0.418	***
Competence	<-->	Pressure and tension	-0.590	***
Competence	<-->	Value/usefulness	0.431	***
Relatedness	<-->	Competence	0.244	***
Effort	<-->	Pressure and tension	-0.152	***
Effort	<-->	Perceived choice	0.277	***
Effort	<-->	Value/usefulness	0.590	***

			<b>Estimate</b>	<b>P</b>
Relatedness	<-->	Effort	0.260	***
Pressure and tension	<-->	Perceived choice	-0.330	***
Pressure and tension	<-->	Value/usefulness	-0.258	***
Relatedness	<-->	Pressure and tension	-0.384	***
Perceived choice	<-->	Value/usefulness	0.339	***
Relatedness	<-->	Perceived choice	0.337	***
Relatedness	<-->	Value/usefulness	0.273	***

\*\*\*  $p < 0.01$

Medium to large correlations, which were statistically significant, were observed between all factors. As can be expected, the factor “pressure and tension” had negative correlations with all other factors.

The goodness-of-fit statistics were calculated between the specified covariance model and that of the data for the questionnaire used in this study. The model yielded a high CMIN/DF value of 8.268. This could be explained by the large data set ( $n=1277$ ) used in this study. The chi-square statistics tend to become larger as sample size increase. A relatively low CFI of 0.79 was found for the model while an acceptable RMSEA value of 0.075 with a 90 % confidence interval of [0.074; 0.077] was obtained. Even though the CFI of this four-factor model was found to be lower than 0.9, the unacceptable CMIN/DF could be explained and the RMSEA was in the required range. It can therefore be assumed that the validity of the questionnaire used in this study is acceptable. The data throughout this chapter will be discussed with regard to the students’ scores in each of the factors respectively.

#### **5.4.5.2 Reliability (internal consistency)**

Internal consistency reflects the coherence (or redundancy) of the components of a scale (McCrae, Kurtz, Yamagata & Terracciano, 2011). Internal consistency can therefore be described as the relationship between each item and each other item, and it can be thought of the relationship of each item to the collection of items or total score (Fraenkel et al., 2012). The internal reliability of a factor can be determined once a factor structure has been confirmed. When an indicator consists of multiple items, factor analysis is used to determine construct validity (Parsian & Dunning, 2009). When items are formulated to measure a certain construct, there should be a high level of similarity among them. A measure of this degree of similarity is an indication of the internal consistency of the instrument. Cronbach’s alpha coefficient is used to measure this internal reliability and it is based on the inter-item correlations. If the items are strongly correlated with each other, their internal consistency is

high and the alpha coefficient will be close to one, but if the items are poorly formulated and do not show a strong correlation, the alpha coefficient will be close to zero.

The formula for calculating the Cronbach alpha coefficient is:

$$r_n = \frac{k}{k-1} \left( 1 - \frac{\sum v_i}{v_T} \right)$$

Where

$r_n$  = the Cronbach alpha coefficient

$\sum v_i$  = sum of variances of the items in the factor

$k$  = number of items in the factor

$v_T$  = variance of the factor

Table 5.7 indicates the figures for Cronbach's alpha coefficient generally accepted by researchers. Generally, reliability estimates of 0.80 are regarded as acceptable while values lower than 0.60 are regarded as unacceptable (Maree & Pietersen, 2010).

**Table 5.7 Interpretation of Cronbach's alpha coefficient (Maree & Pietersen, 2010:146).**

Cronbach's alpha coefficient	Meaning
≈0.7	low reliability
≈0.8	moderate reliability
≈0.9	high reliability,

However, according to Field (2009), when dealing with psychological constructs, values below even 0.7 can realistically be expected because of the diversity of the constructs being measured. The reliability of both the IM and SDL questionnaires will be given in the next paragraphs.

### ***SDLI questionnaire***

Cronbach's alpha coefficient and the inter-item correlations of each of the factors are presented in Table 5.8.

**Table 5.8 Inter-item correlations of SDLI questionnaire**

Factor	Cronbach's alpha coefficient	Mean of inter-item correlation
Learning motivation	0.717	0.303
Planning and implementing	0.816	0.428
Self-monitoring	0.759	0.441
Interpersonal communication	0.706	0.286

From Table 6.3, it is evident that the reliability of the four factors is high. All of the factors had a Cronbach's alpha coefficient of  $\geq 0.7$ , which indicates that there was substantial correlation between all the items of the factors. It also shows that the mean values of the inter-item correlation were all between 0.15 and 0.55. This is a further indication that the correlations between the different items of each factor were substantial. Thus the questionnaire used for this study can be assumed to be reliable.

***IMI questionnaire***

Cronbach's alpha coefficient and the inter-item correlations of each of the factors are presented in Table 5.9.

**Table 5.9 Inter-item correlations of IMI questionnaire**

Factor	Cronbach's alpha coefficient	Mean of inter-item correlation
Interest/enjoyment	0.893	0.556
Perceived competence	0.851	0.502
Effort	0.751	0.377
Value/usefulness	0.920	0.630
Pressure and tension	0.781	0.418
Relatedness	0.641	0.195
Perceived choice	0.786	0.342

From Table 5.9 it is evident that the reliability of six of the seven factors is high. All those factors had a Cronbach's alpha coefficient of  $\geq 0.7$  which indicates that there was substantial correlation between the items of the factors. It also shows that the mean values of the inter-item correlation were all between 0.15 and 0.55. This is a further indication that the

correlations between the items of the factors were substantial. Although the reliability for the relatedness factor measured a bit lower than 0.7, according to Field (2009), reliability lower than 0.7 can be expected for psychological constructs. Therefore the questionnaire used for this study can be assumed to be reliable.

#### **5.4.5.3 Statistical techniques and methods**

The quantitative data of this study were analysed with SPSS version 22. Descriptive statistical techniques and inferential statistics, e.g. ANOVAs, dependent t-tests and ANCOVAs, were used. Where appropriate, p-values and effect sizes were calculated to determine statistical and practical significant differences.

#### **Statistical and practical significance**

P-values and Effect sizes are used to determine the statistical and practical significance of data (Maree & Pietersen, 2010). According to Sullivan & Feinn (2012), effect size is the magnitude of the difference between groups, and it is used to determine if differences between means/effects of data is of practical significance. The p-value is used to determine if there is a statistically significant difference between data from a random sample (Maree & Pietersen, 2010). A p-value of <0.05 indicates the data is statistically significant. Because of the non-probability of this study's sample, p-values will be reported for completeness only, with more focus on effect sizes in the interpretation of results.

Effect sizes are calculated with Cohen's d-value. The formula for calculating Cohen's d-value is:

$$d = \left| \frac{x_1 - x_2}{s} \right|$$

Where

$d$  = Cohen's d-value

$x_1$  = average number of the factor for one group

$x_2$  = average number of the factor for the other group

$s$  = largest standard deviation for the particular factor

Table 5.10 indicates how to interpret Cohen's d-value in terms of effect sizes (Maree & Pietersen, 2010). If a medium to large effect size is observed, data can be believed to be of practical significance.

**Table 5.10 Interpretation of Cohan's d-value (Maree & Pietersen, 2010:151).**

Cohan's d-value	Meaning
≈0.2	Small effect
≈0.5	Medium effect
≈0.8	Large effect

## ANOVA

According to McMillan & Schumacher (2006), an ANOVA is used to compare the mean value of a dependent variable of three or more groups. For the purpose of this study, the ANOVA was done on all factors for the four groups to see if there were any differences between the pre-tests of the experimental and control groups.

## Dependant t-test

A dependent t-test is used to compare the mean value of a variable in one group of subjects with the mean value of the other group of subjects (Hoy, 2009). The t-test procedure evaluates whether there is a significant difference between the means of the two variables. For the purpose of this study, a dependent t-test was done on the following:

- In 2014 a dependent t-test was done on the pre-tests and post-tests of group C1 and group C2 to determine if there are any differences between the SDL skills of the students and their IM from the beginning of the course to the end of the course without an intervention.
- In 2015 a dependent t-test was done on the pre-tests and post-tests of group C3 to determine if there are any differences between the SDL skills of the students and their IM from the beginning of the course to the end of the course without an intervention.
- In 2015 a dependent t-test was done on the pre-tests and post-tests of group E1 to determine if there are any differences between the SDL skills of the students from

the beginning of the course to the end of the course. The students from this group underwent an intervention in the form of the redesigning of the ECON 121 module in a BL environment with a specific focus on CL to promote IM.

For the dependent t-test, the p- value was calculated to determine the statistical significance of the data. The effect sizes of the differences were calculated to determine the practical significance of the data.

## **ANCOVA**

An analysis of covariance (ANCOVA) was performed on the results of the post-test of the control group and the post-test of the experimental group, partialling-out the effect of differences between the pre-tests of the two groups (McMillan & Schumacher, 2006). ANCOVA enables the researcher to adjust the post-test mean scores on the dependant variable for each group to compensate for the initial differences between the groups (Fraenkel et al., 2012). It determines the influence that the intervention had on the experimental group. For the purpose of this study, the ANCOVA was done on the post-tests of all the groups to determine if there were any differences between the SDL skills and IM of the students at the end of the course.

## **5.5 QUALITATIVE RESEARCH**

In the qualitative component of the research, the data were gathered through semi-structured interviews.

### **5.5.1. Research design**

In this study, a basic qualitative research design was followed. A basic study focuses on understanding the world and constructing meaning through the view of groups or individuals (Merriam, 2014). Nieuwenhuis (2010) describes basic qualitative research as the attempt to collect rich descriptive data in respect of a particular phenomenon or context with the intention of developing an understanding of what is being observed or studied. According to Merriam (2014), researchers who conduct a basic study would be interested in three things, namely (a) how people interpret their experiences, (b) how they construct their worlds, and (c) what meaning they attribute to their experiences.

The primary purpose of the semi-structured interviews conducted at the end of the module was to get more insight on the quantitative findings of the study (Creswell & Plano Clark, 2011).

### **5.5.2 Participants**

From the population mentioned in §5.3, participants were selected by simple random sampling to participate in the qualitative part of the research. A random sample is defined as a sample of the population where every member of the population has an equal chance of being selected (Creswell, 2009). From a total of 397 students in the E1 group, 124 students completed both questionnaires. From the 124 students, 9 students were randomly selected to participate in the interviews. These students also participated in the voluntary team challenge.

### **5.5.3 Interview schedule**

According to Merriam (2014), semi-structured interviews are open ended and allow respondents to define their views in their own unique way. After the quantitative data were analysed, the interview questions were formulated based on the findings of the questionnaire to enable the researcher to clarify certain aspects of the findings. The questions were submitted to the ethics committee of the Faculty of Education Sciences at the North-West University and were approved. In Table 5.11 below the interview questions and the reason for choosing the particular questions are given.

**Table 5.11 Interview questions**

	Question	Reason
1	<p>Is there a difference between the extent to which you were motivated at the beginning of the semester and the extent to which you were motivated at the end of the semester?</p> <p>1.1. If so, were you more motivated or less motivated at the end of the semester?</p> <p>1.2. What would you attribute this difference in motivation to?</p>	<p>From the quantitative data it appeared that the overall motivation of students were relatively low throughout the duration of the module. However, it seems that the motivation were even lower towards the end of the module. The researcher wanted to determine what the reason for this finding could be.</p>
2	<p>Throughout the course of the semester you have been working in groups on a regular basis, both during the contact sessions, in the classroom and online. Answer the following questions (2-6):</p> <p>Tell me how you experienced the group activities in class during the contact session.</p>	<p>During the intervention the students were exposed to different modes of CL, Namely, face-to-face and online. The researcher wanted to find out how they experienced the different modes and if the fact that they might not prefer a certain mode could be the reason for the lower motivation.</p>
3	<p>Tell me how you experienced the online group activities.</p>	
4	<p>What influence did working in groups have on your motivation to take responsibility for your own learning?</p>	
5	<p>To what extent do you feel responsible for the learning of your group members?</p>	<p>CL was a new experience for the students, especially the online activities. From the quantitative results it seems that the overall SDL skills of the students did not change significantly towards the end of the module. The researcher wanted to find out if the fact that they had to work in groups contributed to this finding.</p>
6	<p>What is your opinion of the nature of the tasks that you received in this module?</p>	

**Table 5.11 Interview questions (continue)**

Question	Reason
<p>7 The following questions refer to the online team challenge:</p> <p>7.1. How did you feel about the fact that you could choose whether you would like to participate in the team challenge or not?</p> <p>7.2. How did your optional participation in the challenge impact your involvement in the challenge?</p> <p>7.3. How did the fact that you did not receive marks for the assignments influence your motivation to take part?</p>	<p>From the quantitative results it seemed that the <i>choice</i> factor of the IM questionnaire measured slightly lower towards the end of the module. The researcher wanted to determine if the fact that the online challenge was optional and that they did not receive marks for the activities contributed to this finding.</p>
<p>8 What was your experience of the collaboration in the groups?</p>	<p>From the quantitative results it seems that the <i>effort and competence</i> factor of the IM questionnaire measured slightly less towards the end of the module. The researcher wanted to determine what the attitude and the group dynamics were regarding these two factors.</p>
<p>9 From the quantitative research it turned out that the students in general were very tense during the module and they were even tenser towards the end of the module.</p> <p>9.1. What do you think is the reason for this finding?</p> <p>9.2. How does your experience correlate with this finding?</p>	<p>From the quantitative results it seems that the <i>tension</i> factor of the IM questionnaire measured slightly higher towards the end of the module. The researcher wanted to determine the reason for this finding.</p>

#### **5.5.4 Data gathering procedure**

Semi-structured interviews were conducted by the researcher with the selected students. The interviews were conducted telephonically at the end of the module. Students from the experimental group E1 were randomly selected and only those students who provided informed consent were interviewed. Data saturation was reached after nine interviews and there was no need for contacting more students. The interviews were done by the researcher to obtain the students' experiences in the most accurate way possible. Participants were expected to elaborate on some of the questions and issues addressed in the questionnaire.

#### **5.5.5 Data analysis: qualitative research**

A qualitative data analysis computer program, ATLAS.ti™ version 6, was used to analyse the qualitative data. ATLAS.ti™ is a software package that enables researchers to organise text, graphic, audio and visual data files, along with their coding, memos and findings into a project (Creswell, 2009) the data gathered through the semi-structured interviews were transcribed and allocated to a hermeneutic unit. The data analysis of the semi-structured interviews for this study was done according to the process for analysing qualitative data proposed by Creswell (2009):

*Step 1. Organise and prepare the data for analysis.*

This step involves transcribing the interviews and sorting or arranging the data to ease the process of analyses that will follow (Creswell, 2009). Deciding on what to analyse in what detail and sampling considerations are important factors before selecting the unit of analysis (Elo & Kyngas, 2007). The semi-structured interviews were conducted telephonically through Skype™. The conversations were recorded as MP3 files. The MP3 files were then transcribed and prepared for the data analysis process.

*Step 2. Read through all the data.*

To obtain a general sense of the information and to reflect on its overall meaning, it is necessary to carefully read through all the data before starting the coding process (Creswell, 2009; Fries, 2014). The researcher read through all the transcribed documents to get an overall impression of the data. While doing this, the transcripts were also spellchecked and the names of participants were removed.

*Step 3. Begin detailed analysis with a coding process.*

A deductive process of data analysis was used in this study. Deductive content analysis is used when the structure of analysis is operationalised on the basis of previous knowledge and the purpose of the study is theory testing (Elo & Kyngas, 2007). Deductive content analysis is often used in cases where the researcher wishes to retest existing data in a new context or when testing categories, concepts, models or hypotheses. In this study, the researcher wanted to use the qualitative data to explain some of the results from the quantitative research. Therefore, the codes used in the coding process were set up according to these aspects, focusing on concepts from the quantitative questionnaires. The data gathered from the semi-structured interviews were coded in ATLAS.ti™ according to the codes in Table 5.12.

**Table 5.12 Code names for qualitative data analysis**

	Code name
1	Challenges
2	CL: group processing
3	CL: individual accountability
4	CL: positive interdependence
5	CL: positive interdependence (neg)
6	CL: promotive interaction
7	CL: social skills
8	Motivation: effort
9	Motivation: interest/enjoyment
10	Motivation: perceived choice
11	Motivation: perceived choice (neg)
12	Motivation: perceived competence
13	Motivation: relatedness
14	Motivation: tension (no change)
15	Motivation: tension (other students)
16	Motivation: tension (own - less towards end)
17	Motivation: tension (own - more towards end)
18	Motivation: value/usefulness
19	SDL (neg)
20	SDL (pos)

*Step 4. Use the coding process to generate categories or themes for analysis.*

After the coding process, the lists of concepts are grouped under higher order headings. Data are grouped to reduce the number of units or concepts by creating categories (Elo & Kyngas, 2007). However, Elo & Kyngas (2007) point out that creating categories is not simply bringing together observations that are similar or related; instead, data are being classified as “belonging” to a particular group, implying a comparison between these data and other observations that do not belong to the same category. When formulating categories by inductive content analysis, the researcher comes to a decision through interpretation as to which data to put in the same category (Flick, 2007). Main categories may be broken up into subcategories and each main and subcategory are named by using content-characteristic words (Corbin & Strauss, 2014). According to Nieuwenhuis (2007), it is possible that some of the codes do not fit into the categories identified. He states that those codes should not be forced into categories but rather left as separate concepts since it might still represent an important finding. The categories, or families as it is called in ATLAS.ti™, associated with the codes for this study are presented in Table 5.13.

**Table 5.13 Families for qualitative data analysis**

	Code name	Families
1	Challenges	Challenges
2	CL : group processing	CL
3	CL: individual accountability	
4	CL: positive interdependence	
5	CL: positive interdependence (neg)	
6	CL: promotive interaction	
7	CL: social skills	
8	Motivation: effort	
9	Motivation: interest/enjoyment	
10	Motivation: perceived choice	
11	Motivation: perceived choice (neg)	
12	Motivation: perceived competence	
13	Motivation: relatedness	
14	Motivation: tension (no change)	

**Table 5.13 Families for qualitative data analysis (continue)**

	Code name	Families
15	Motivation: tension (other students)	
16	Motivation: tension (own - less towards end)	
17	Motivation: tension (own - more towards end)	
18	Motivation: value/usefulness	
19	SDL (neg)	SDL
20	SDL (pos)	

In Table 5.14, the description of the families that was used in qualitative analysis is given.

**Table 5:14 Description of families used in qualitative analysis**

Family	Codes	Description
IM	Interest/enjoyment	Did the students feel that the activities from the team challenge were interesting and did it hold their attention? Was it fun to participate and did they enjoy the work?
	Perceived competence	The students' perspective on how competent they were to complete the activities throughout the duration of the module and how the completion of the activities influenced their perceived competence afterwards.
IM	Effort	The amount of effort that the student put into the activities. Did they only do it to finish in time or did they spend enough time on it so that they could do well and learn from the activities?
	Value/usefulness	The students' perspective on the value, usefulness and importance of the activities and their perception of whether they would benefit from it in the end.
	Tension/pressure	The tension, stress and anxiety experienced throughout the duration of the course.
	Relatedness	The relationship and trust between team members. Not only whether they worked well in their groups during the team challenge but also if they think the fact that they were grouped together opened the chance to future friendship relationships.
	Perceived choice	Did the students feel that they had a choice whether they want to participate in the activities and whether that perceived choice influenced their decision to partake?

**Table 5:14 Description of families used in qualitative analysis (continue)**

Family	Codes	Description
CL	Individual accountability	It involves two components: (1) each student is responsible for his or her own learning, and (2) each student is responsible for helping the other group members learn.
	Positive interdependence	Linking students together so one cannot succeed unless all group members succeed.
	Social skills	Interpersonal and small group skills, where individuals trust each other, make decisions, resolve conflicts and communicate effectively.
	Promotive interaction	Students facilitate each other's efforts to succeed in the group's goal through supportive interaction.
	Group processing	The reflection on the contributions of group members on activities to assess who performed well and which actions should be continued or discontinued.
SDL	SDL	The students' ability to take responsibility for their own learning by determining their learning requirements and goals, selecting resources to achieve the goals, deciding upon and employing their preferred learning strategies, and assessing the outcomes of the learning process.

*Step 5. Analyse and interpret the data.*

Creswell (2009) explains that this step involves presenting descriptions and themes to convey the findings of the analysis, as well as interpreting the findings of the analysis and reporting on it in a narrative format. In this study the network views that represent the relationships between the main aspects of the finding along with the responses of the students are given. The interpretation and analysis of the findings in relation with the quantitative results is also discussed.

**5.5.6 Trustworthiness**

Trustworthiness is of utmost importance in qualitative research. Consistence and credibility checks should be done to ensure validity and reliability of the data (Nieuwenhuis (2007). For the purpose of this study, the trustworthiness was assured by the following measures: (a) verifying raw data and (b) co-coding of data.

### **5.5.6.1    *Verifying raw data***

The interviews conducted by the researcher were recorded as MP3 files. These files were given to a transcriber who thoroughly transcribed all the interviews. The transcribed interviews were returned to the researcher who carefully listened through each interview to confirm if the interviews were transcribed correctly. The transcripts and sound files were also given to a third party to do spot checks, and the precision of the transcripts were confirmed.

### **5.5.6.2    *Co-coding of data***

The researcher coded a portion of the interviews while at the same time the promoters of the study co-coded a smaller percentage of the interviews. The researcher and promoters had a discussion to compare the two sets of codes and an agreement was reached on which codes to include in the analysis of the data. The researcher chose to use the promoters of the study as co-coders because they are invested in the study and they were the most reliable source to ensure trustworthiness of the data.

## **5.6            ETHICAL ASPECTS**

The research was conducted in accordance with the ethical codes as stipulated by the ethical committee of the Faculty of Education of the North-West University. The factors below were considered.

### **5.6.1            Informed consent**

Participants were informed about the nature of the study by the lecturer. Students had a choice to take part in the online challenge. The challenge did not contribute to or influence their marks for the module in any way. Students were also asked to complete the quantitative questionnaires voluntarily. It was clearly indicated in the introduction section of the questionnaire that they should only complete the questionnaire if they give consent that the data may be used for research purposes. Participants had the option to withdraw at any stage of the study.

### **5.6.2            Ethics**

The necessary ethics application form was completed and submitted to the North-West University's ethics committee, and permission was attained to commence with the research.

Permission from the relevant deans and staff of the faculties and students were also attained.

### **5.6.3 Student confidentiality**

Because the North-West University complies with the Promotion of Access to Information Act 2 of 2000 and the Protection of Personal Information Act (4 of 2013), the students' confidentiality and privacy were respected at all times. Students were expected to include their student numbers when they filled in the questionnaires, because it was necessary in order to pair pre- and post-tests. However, these data were only used by the statistical services and were not made available to anyone else. For the qualitative component, only the students that gave consent that their contact information may be made available for academic purposes were contacted to ask if they would be willing to take part in the interview process.

## **5.7 CHAPTER SUMMARY**

In this chapter, the research design and methodology were explored. The study was conducted from a constructivist perspective. A sequential explanatory mixed method design was used and the quantitative and qualitative components of the research were therefore attended to separately. For the quantitative component, the selection of the IM and SDL questionnaires as measuring instrument were discussed and the population were described. In the quantitative component of the research, the data were gathered through semi-structured interviews. A basic qualitative research design was followed and a deductive process of data analysis was used.

## CHAPTER 6

# RESULTS AND ANALYSIS

### 6.1 INTRODUCTION

In the previous chapter the research design and methodology used in this study, viewed from a constructivist perspective were addressed. The research design and methodology, research methods, population and sampling, measuring instruments, data analysis, data collection procedures and ethical aspects for both the quantitative and qualitative data were discussed. The purpose of this chapter is to report the findings from both the quantitative and qualitative research process and to recognise the relationship between these two processes. It addresses the following two sub-aims: iii) to determine the influence of the adopted cooperative learning (CL) strategies on intrinsic motivation (IM) and self-directed learning (SDL) in a blended learning (BL) environment; and iv) to discuss the results from the quantitative research (refer §6.2) and the qualitative research (refer §6.3). For the purpose of reporting on data, IM and SDL are reported on in the same table. The chapter presents the conclusions from the combined analysis.

### 6.2 RESULTS FROM QUANTITATIVE RESEARCH

In the following sections the results from the quantitative research will be discussed.

#### 6.2.1 ANOVA of the pre-tests of all four groups

An ANOVA was done on the factors for the control groups ( $C_1$ ,  $C_2$ ,  $C_3$ ) and experimental group ( $E_1$ ) to determine if there were any significant differences between the IM values and SDL skills of students from the control groups and the experimental group at the beginning of each year. An assumption of ANOVA is the normality of the data. Because of the large sample sizes, the central limit theorem states that the means are normally distributed. Another assumption of ANOVA is homogeneity of variances which holds for all variables because  $p > 0.5$ . Table 6.1 shows the results of this test. The closer the IM mean is to 7, the higher the IM, and the closer the SDL mean is to 100, the higher the SDL level for that specific factor.

**Table 6.1 ANOVA on the pre-tests of group E<sub>1</sub> and C<sub>(1,2,3)</sub>**

	Means				Mean Square Error	p	Effect sizes (d) E1 component with:		
	E <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>			C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
<b>Interest/enjoyment</b>	5.44	4.75	5.13	5.93	1.26	0.00	0.55**	0.26*	0.04
<b>Perceived competence</b>	5.04	4.26	4.95	4.98	1.06	0.00	0.60**	0.08	0.06
<b>Effort</b>	5.70	5.20	5.59	5.65	0.97	0.04	0.46**	0.12	0.06
<b>Value/usefulness</b>	5.89	5.30	5.65	5.90	1.06	0.00	0.46**	0.21*	0.01
<b>Pressure/tension</b>	2.68	3.15	2.99	2.84	1.48	0.92	0.13	0.24*	0.32*
<b>Relatedness</b>	5.08	5.00	4.89	5.09	1.22	0.41	0.02	0.15	0.06
<b>Perceived choice</b>	4.69	4.46	4.52	4.88	1.59	0.04	0.18	0.1	0.14
<b>SDL</b>	80.90	77.83	80.12	81.47	80.93	0.09	0.33**	0.08	0.06

\* Small effect \*\*Medium effect \*\*\*Large effect

For the interest/enjoyment, perceived competence, effort and value/usefulness and perceived choice factors, there were statistically significant differences between the experimental group (E<sub>1</sub>) and the control groups C<sub>(1,2,3)</sub>. Because the students were not randomly assigned to the lecturers, it is possible that these groups were not equal in terms of their IM and SDL scores. However, comparing the post-test controlled for these differences in the pre-tests.

In the next section the differences between pre-tests and post-tests of year 1 of the study, and again for year two of the study will be discussed. These tests were done to determine if there were a difference in the students IM and SDL skills from the beginning to the end of the module so that the influence of the intervention can be determined.

### **6.2.2 Differences in intrinsic motivation and self-directed learning from pre-test and post-tests: year one**

Pre-tests and post-tests were done in year one and year two of the study to determine if there was a difference in the students' IM and SDL skills from the beginning to the end of the module so that the influence of the intervention could be determined.

For year one (control group) of the study, a dependent t-test was done on the pre-tests and post-tests of group C<sub>1</sub> and C<sub>2</sub>. Neither of these groups received an intervention. A dependent t-test is used when two groups that have been matched are compared (refer §5.4.4.3). The

results for the dependent t-tests done on the first year of the study for both the IM and SDL questionnaires are given in Table 6.2 and 6.3.

Table 6.2 shows the results from the dependent t-tests for both the IM and SDL questionnaires that were done on the pre-tests and post-tests of group C<sub>1</sub>. Group C<sub>1</sub> refers to the students attending Lecturer A's classes. P-values and effect sizes (d-values) were used to determine the statistical and practical significance of the data (refer §5.4.5.3). The mean values shown in the tables for the quantitative research refer to the average score for each factor. The closer the IM mean is to 7, the higher the IM, and the closer the SDL mean is to 100, the higher the SDL level for that specific factor.

**Table 6.2 Dependent t-tests on pre-tests and post-tests of group C<sub>1</sub>**

Variable	Pre-test (n=42)		Post-test (n=42)		p	d
	Mean	Std. Dv.	Mean	Std. Dv.		
Interest/enjoyment	4.75	1.23	4.48	1.31	0.26	0.22*
Perceived competence	4.26	1.28	3.96	1.45	0.12	0.23*
Effort	5.20	1.08	5.20	1.16	1.00	0.00*
Value/usefulness	5.30	1.21	4.94	1.49	0.21	0.28*
Pressure and tension	3.15	1.47	3.89	1.45	0.00	0.50**
Relatedness	5.00	0.93	4.73	1.11	0.11	0.29*
Perceived choice	4.45	1.21	3.83	1.45	0.01	0.51**
<b>SDL</b>	77.83	9.11	82.92	9.03	0.00	0.56**

\* Small effect \*\*Medium effect \*\*\*Large effect

From Table 6.2 it is evident that the students from group C<sub>1</sub> experienced more tension/pressure towards the post test that was at the end of the module, with a statistically significant difference between the data of the pre-test and post-test. The effect sizes were 0.5 and therefore the difference was of medium practical significance. There were also a statistically significant difference in the perceived choice factor which measured lower towards the post-test (end of the module). This effect size was slightly higher than 0.5 and the difference was also of a medium practical significance. For the rest of the factors, the p-values were higher than 0.05, and the effect sizes were close to 0.2, which is an indication

that there was no statistically or practically significant difference between the data of the pre-tests and the post-tests of group C<sub>1</sub>.

It was also evident that the SDL skills of the students from group C<sub>1</sub> were higher towards the end of the module, with a statistically significant difference between the data of the pre-test and post-test. The effect size was higher than 0.5, which indicates that the difference was of medium practical significance. Thus, from the above data it can be assumed that there was a tendency of higher tension/pressure and lower perceived choice values, and higher SDL-skills of the students from the beginning to the end of the module.

Table 6.3 shows the results from the dependent t-tests that were done on the pre-tests and post-tests of group C<sub>2</sub>. Group C<sub>2</sub> refers to the students who did not attend Lecturer A's classes. The intervention in year 2 was implemented by Lecturer A and therefore it was important to also look the students from other lecturers who did not receive the intervention in the same year.

**Table 6.3** Dependent t-tests on pre-tests and post-tests of group C<sub>2</sub>

Variable	Pre-test (n=107)		Post-test (n=107)		p	d
	Mean	Std. Dv.	Mean	Std. Dv.		
Interest/enjoyment	5.13	1.15	4.84	1.18	0.01	0.25*
Perceived competence	4.48	1.10	4.95	1.20	0.45	0.09*
Effort	5.59	0.90	5.33	1.13	0.02	0.29*
Value/usefulness	5.65	1.12	5.31	1.2	0.00	0.30*
Pressure and tension	2.99	1.28	3.53	1.39	0.00	0.42**
Relatedness	4.88	1.21	4.57	1.10	0.01	0.26*
Perceived choice	4.52	1.33	4.04	1.29	0.00	0.36**
SDL	80.12	8.7	83.50	8.6	0.00	0.39**

\* Small effect \*\*Medium effect \*\*\*Large effect

From Table 6.9 it is evident that, as with the students in group C<sub>1</sub>, the students from group C<sub>2</sub> experienced more tension/pressure towards the end of the module, with a statistically significant difference between the data of the pre-test and post-tests. However, the effect sizes were approximately medium and the difference was of practical significance. The perceived competence factor measured no statistically or practically significant difference. The rest of the factors measured slightly lower towards the end of the module with a

statistically significant difference, but the difference was not of practical significance with effect sizes between 0.25 – 0.36. As with the students from group C<sub>1</sub>, there was a statistically significant difference between the data of the pre-test and post-tests regarding the SDL factor. The effect sizes were of small to medium practical significance.

Thus, for year one of the study, it seems like the tendencies in both the groups were the same. The tension/pressure factor measured higher in both groups at the end of the module. Both the groups had an increase in SDL and the rest of the factors all measured slightly lower towards the end of the module.

### 6.2.3 Differences in intrinsic motivation and self-directed learning from pre-tests ad post-tests: year two

The differences between the pre-tests and post-tests for year two of the study for the students from Lecturer A's group (E<sub>1</sub>) and the students that did not receive an intervention (C<sub>3</sub>) were determined with a dependent t-test, and p-values and effect sizes (d-values) were used to determine the statistical and practical significance of the data (refer §5.4.5.3).

The mean values shown in Tables 6.4 and 6.5 refer to the average score for each factor. The closer the IM score is to 7, the higher the IM, and the closer the SDL score is to 100, the higher the SDL level for that specific factor. Table 6.4 shows the p-values and d-values for the data of group (C<sub>3</sub>) from year two.

**Table 6.4 Dependent t-tests on the pre-tests and post-tests of group C<sub>3</sub>**

Variable	Pre-test (n=258)		Post-test (n=258)		p	d
	Mean	Std. Dv.	Mean	Std. Dv.		
Interest/enjoyment	5.39	1.09	5.16	1.2	0.00	0.37*
Perceived competence	4.97	0.96	4.62	1.2	0.00	0.37*
Effort	5.64	1.03	5.15	1.19	0.00	0.58**
Value/usefulness	5.90	0.95	5.45	1.23	0.00	0.47**
Pressure and tension	2.84	1.03	3.52	1.19	0.00	0.58**
Relatedness	5.09	1.06	4.42	1.16	0.00	0.64**
Perceived choice	4.87	1.22	4.16	1.32	0.00	0.59**
SDL	81.47	8.95	81.55	10.69	0.88	0.01

\* Small effect \*\*Medium effect \*\*\*Large effect

From Table 6.4 it is evident that the students from group C<sub>3</sub> experienced more tension/pressure towards the end of the module, with a statistically significant difference between the data of the pre-test and post-test. The effect sizes were close to 0.5 and the difference was of medium practical significance. The rest of the IM factors measured statistically lower towards the end of the module. The difference regarding the Interest/enjoyment and perceived competence factors were of small practical significance, and the differences for effort, value/usefulness, relatedness and perceived choice were of medium practical significance. There was no statistically or practical significant difference in the SDL score between the data of the pre-test and post-test.

Table 6.5 shows the p-values and d-values of the data for the experimental group E<sub>1</sub> who attended Lecturer A's classes in year 2.

**Table 6.5 Dependent t-tests on the pre-tests and post-tests of group E<sub>1</sub>**

Variable	Pre-test (n=124)		Post-test (n=124)		p	d
	Mean	Std. Dv.	Mean	Std. Dv.		
Interest/enjoyment	5.43	1.11	5.30	1.23	0.27	0.12
Perceived competence	5.03	1.00	4.98	1.26	0.67	0.05
Effort	5.70	0.90	5.48	1.11	0.13	0.24*
Value/usefulness	5.89	0.98	5.48	1.30	0.01	0.41*
Pressure/tension	2.68	1.09	3.36	1.39	0.00	0.62**
Relatedness	5.07	1.12	4.05	1.30	0.00	0.90***
Perceived choice	4.69	1.28	4.10	1.45	0.00	0.46**
SDL	80.90	9.26	83.14	11.24	0.01	0.24*

\* Small effect \*\*Medium effect \*\*\*Large effect

From Table 6.5 it is evident that, as with the students in the control groups (C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>), the students from group E<sub>1</sub> experienced more tension/pressure towards the end of the module, with a statistically significant difference between the data of the pre-test and post-tests. The effect sizes were relatively close to 0.5 and the difference was of medium practical significance. For the interest/enjoyment, perceived competence and effort factors, there was no statistically or practically significant difference. The value/usefulness and perceived choice factors measured statistically lower towards the end of the module with a medium

practical significance. The relatedness factor measured statistically and practically lower towards the end of the module.

As with the students from the control groups in year 1 ( $C_1$ ,  $C_2$ ), there was a statistically significant difference between the data of the pre-test and post-tests regarding the SDL factor. However, the effect sizes were small and the difference was not of practical significance.

When comparing the groups in year two of the study, it seems like the tendencies in both the groups were the same. The tension/pressure factor measured higher in both groups at the end of the module. The rest of the factors all measured slightly lower towards the end of the module. However, although group  $E_1$  had an increase in SDL, group  $C_3$  measured no change for this factor.

The students from the experimental group and the students from group  $C_1$  both attended the classes of Lecturer A. When comparing these two groups it was also found that the tension/pressure factor measured higher in both groups at the end of the module. The rest of the factors all measured slightly lower towards the end of the module and the SDL of both groups measured higher towards the end. Therefore, from the quantitative data analysis, it is evident that there were very little differences between any of the four groups. This indicates that there might be some external factors, and not only the intervention, that could have influenced the experiences of the students.

#### **6.2.4 Differences between the post-tests of the experimental and control groups**

The ANCOVA was done to determine if there were any differences between post-tests of the control groups ( $C_1$ ,  $C_2$ ,  $C_3$ ) and experimental group ( $E_1$ ) by controlling for differences in the pre-test. The assumption of the homogeneity of variances holds for all variances. However, the assumption of homogeneity of regression slopes does not hold for any of the variables and therefore the results of the ANOVA will be reported instead. The results of the ANOVA are shown in Table 6.6. The closer the IM mean is to 7, the higher the IM, or the closer the SDL mean is to 100, the higher the SDL level for that specific factor.

**Table 6.6 ANCOVA on the post-tests of group E<sub>1</sub> and C<sub>(1,2,3)</sub>**

	Adjusted means				Mean Square Error	p	Effect sizes (d) E1 component with:		
	E <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>			C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
<b>Interest/enjoyment</b>	5.32	4.49	4.45	4.99	1.57	<0.01	0.63**	0.39*	0.26*
<b>Perceived competence</b>	4.99	3.95	4.20	4.60	1.64	<0.01	0.70**	0.11	0.28*
<b>Effort</b>	5.49	5.20	5.33	5.15	1.34	0.05	0.25*	0.14	0.28*
<b>Value/usefulness</b>	5.53	4.94	5.31	5.44	1.64	0.06	0.40*	0.16	0.06
<b>Pressure/tension</b>	3.35	3.90	3.53	3.52	1.86	0.18	0.37*	0.12	0.12
<b>Relatedness</b>	4.09	4.73	4.56	4.42	1.41	0.02	0.50**	0.38*	0.26*
<b>Perceived choice</b>	4.11	3.84	4.05	4.16	1.86	0.52	0.18*	0.05	0.04
<b>SDL</b>	83.14	82.92	83.50	81.55	106.53	0.29	0.42*	0.11	0.14

\* Small effect \*\*Medium effect \*\*\*Large effect

Regarding interest/enjoyment, perceived competence, effort and value/usefulness, the post-test values of the experimental group were the highest. The differences between the post-tests in all four these factors, were of statistical significance. There were small practically significant differences between the experimental group and C<sub>1</sub> for effort and value/usefulness and medium practically significant differences for interest/enjoyment, perceived competence. There were a small to medium practical significant difference between the experimental group and C<sub>1</sub> regarding the interest/enjoyment, perceived competence factor. The post-test value for relatedness was the highest for group C<sub>1</sub>. The differences in relatedness were of statistical significance and there were a medium practically significant differences between the experimental group and C<sub>1</sub> and small practically significant differences between the experimental group and C<sub>2</sub> in the relatedness. Regarding the perceived choice factor, tension and SDL the post-test values did not differed significantly.

The post-test value for group C<sub>2</sub> were the highest regarding SDL. This difference were of statistical significance and there were a small practically significant difference between the experimental group and C<sub>1</sub>.

### 6.3 CONCLUSION FROM THE QUANTITATIVE RESEARCH

### ***Interest/enjoyment***

As seen in Table 6.2 and Table 6.3 there was a slight decrease in the values of the interest/enjoyment factor from the beginning of the module towards the end of the module for year one of the study for both the control groups (C<sub>1</sub> and C<sub>2</sub>). Although the difference was of statistical significance, there were no practical significance in the changes. In year one of the study, Table 6.4 and Table 6.5 show that the interest/enjoyment factor for both the groups seemed to have decreased toward the end of the module. However, the interest/enjoyment factor for the students of the experimental group measured slightly higher in the pre-test and in the post-test than the students from the control group. The differences between the post-tests from both the control and experimental groups on the interest/enjoyment factor were of statistical significance. The control group (C<sub>3</sub>) showed a medium practical significance and the experimental group (E<sub>1</sub>) showed no practically significant difference in the interest/enjoyment factor from the pre-test to the post-test. Although none of the groups showed an practical significant increase in this factor from the beginning to the end of the module, it seem that all the groups measured relatively high in this factor at the end of the module with adjusted means between 4.45 and 5.32 out of a possible 7 (refer Table 6.6). Although not of practical importance, the experimental group measured the highest with an adjusted mean of 5.24. This indicates that even though there was not a high practical significant difference between the pre-tests and the post-tests, the students still found the activities quite interesting and enjoyable.

### ***Perceived competence***

As seen in Table 6.2 and Table 6.3 in year one of the study there was a slight decrease in the values of the perceived competence factor of group C<sub>1</sub> from the beginning of the module to the end of the module. Group C<sub>2</sub> measured slightly higher at the end of the module. However, neither of the differences were of statistical or practical significance. In year two of the study, Table 6.4 and Table 6.5 show that the perceived competence factor for both the experimental group and the control group measured slightly lower toward the end of the module. The effect sizes indicated a medium practical significant difference for the control group, but for the experimental group these differences were very low and no practically significant differences in the perceived competence factor could be indicated. In all four of the groups, it can be deduced that the students felt a little less competent at the end of the module. This could be a result of the fact that the workload at the end of the semester was very high and that they did not feel prepared for the examination lying ahead. However, again when looking at the adjusted means at the end of the module (refer Table 6.6), the

experimental group ( $E_1$ ) measured slightly higher than the control groups. This indicates that the intervention could have helped the students to feel a bit more competent than the students who did not participate in the team challenge.

### ***Effort***

As seen in Table 6.2 and Table 6.3, in year one of the study there were no differences for group  $C_1$ , and for group  $C_2$  there was only a slight decrease in the values of the effort factor from the beginning of the module to the end. Although the difference for  $C_2$  was of statistical significance, there was no practical significance in the changes. In year two of the study, Table 6.4 and Table 6.5 show that the effort factor for both the experimental group and the control group measured slightly lower toward the end of the module. Again the effect sizes for these differences were very low with no practically significant differences. Although none of the groups showed an increase in this factor from the beginning to the end of the module, all the groups measured relatively high in this factor at the end of the module, with adjusted means between 5.15 and 5.49 out of a possible 7 (refer Table 6.6). This might be an indication that, regardless of the intervention, because of the nature of the module the students are expected to work hard and put in extra effort in order to succeed.

### ***Value/usefulness***

As seen in Table 6.2 and Table 6.3, there was a slight decrease in the values of the value/usefulness factor from the beginning to the end of the module for both the groups in year one of the study. Although the difference from group  $C_2$  was of statistical significance, there was no practical significance in the changes of either of the groups. In year two of the study, Table 6.4 and Table 6.5 show that the value/usefulness factor for both the experimental group and the control group measured slightly lower at the end of the module. Again the effect sizes for these differences were very low with no practically significant differences. However, when looking at the adjusted means at the end of the module (refer Table 6.6), the experimental group ( $E_1$ ) measured slightly higher than the control groups with 5.53 out of a possible 7. This might be an indication that the students that participated in the intervention could see the value of the task and activities they were supposed to do even though some of the activities did not count towards their participation marks.

### ***Tension/Pressure***

From Table 6.2 and Table 6.3 it is evident that the tension/pressure factor measured relatively high for all the students at the beginning and again at the end of the module. It also

shows that the tension/pressure of the students increased towards the end of the module. These differences were of statistical significance and of a medium practical significance. Table 6.4 and Table 6.5 show that the tendency was the same for year two of the study. Again the tension/pressure of the students increased towards the end of the module. These differences were of statically significance and of medium practical significance. The nature of the module, the workload and the fact that the post-test was conducted close to the exam might have influenced the tension and pressure levels of the students. However, when looking at the adjusted means at the end of the module (refer Table 6.6), the experimental group (E<sub>1</sub>) measured slightly lower than the control groups for this factor. This might indicate that by participating in the intervention, students felt better prepared and equipped throughout the module and felt a bit less stressed at the end of the module than the students that did not participate in the team challenge.

### ***Relatedness***

As seen in Table 6.2 and Table 6.3, there was also a decrease in the values of the relatedness factor from the beginning to the end of the module for both the groups in year one of the study. Although the differences from both the groups were of statistical significance, there was no practical significance in the differences. In year two of the study, Table 6.4 and Table 6.5 show that the relatedness factor for both the experimental group and the control group also measured slightly lower towards the end of the module. The differences from both the groups were of statistical significance, and the differences from the experimental group was practically significant. When looking at the adjusted means at the end of the module (refer Table 6.6), the experimental group (E<sub>1</sub>) measured slightly lower than the control groups for relatedness. The students from the experimental group had to work in groups throughout the duration of the module while this was not expected from the other students. For most of the tasks the students had to work in groups assigned to them and could not choose their group members. It might be possible that the students would have preferred working in groups with their friends rather than with strangers.

### ***Perceived choice***

As seen in Table 6.2 and Table 6.3, there was a slight decrease in the values of the perceived choice factor from the beginning to the end of the module for both the groups in year one of the study. Although the differences from both the groups were of statistical significance, only group C1 was of medium practical significance. In year two of the study, Table 6.4 and Table 6.5 show that the perceived choice factor for both the experimental group and the control group also measured slightly lower towards the end of the module. The

effect sizes for these differences were very low with no practically significant differences. For all four of the groups, there were tasks that were compulsory because it counted towards their participation marks. They therefore did not have a choice whether they wanted to complete it or not. However, the students from the experimental group did have a choice to participate in the team challenge or not. The fact that the experimental group also felt that choice to participate did not lie in their hands might also be related to the principle of positive interdependence. They know if they decided not to do their part in the group, their whole team would carry the consequences, and therefore they had to do their part.

### ***Self-directed learning***

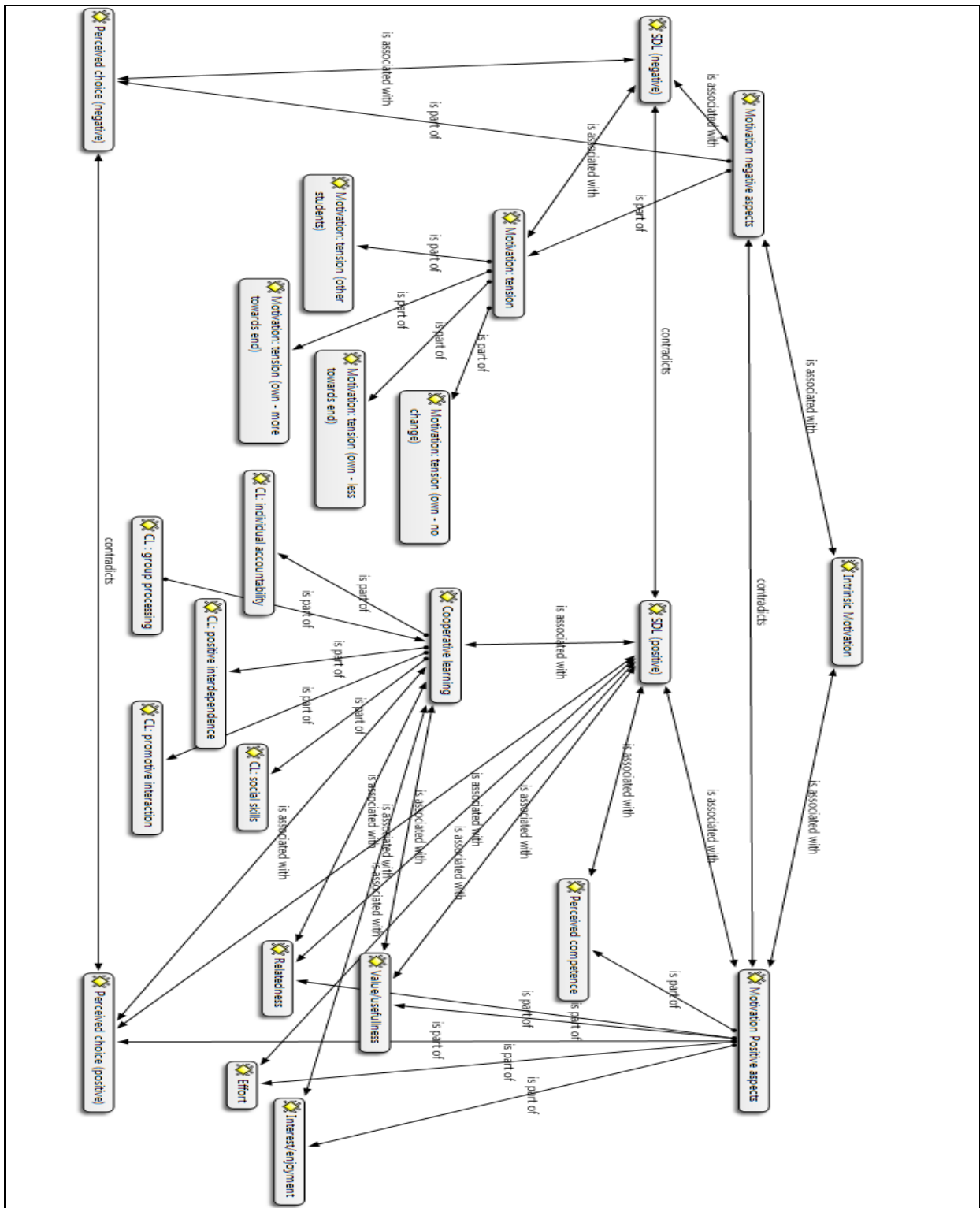
As seen in Table 6.2 and Table 6.3, there was a slight increase in SDL from the beginning to the end of the module for both the groups in year one of the study. Although the differences from both the groups were of statistical significance, only group C<sub>1</sub> had a medium practical significance in the differences. In year two of the study, Table 6.4 and Table 6.5 show that SDL skills for both the experimental group and the control group also measured slightly higher towards the end of the module. Again the effect sizes for these differences were very low with no practical significant differences. Because the effect was not significant, the slight increase in SDL can be attributed to the natural growth of the students and the impact of the tertiary environment on their SDL skills from the beginning to the end of the module.

## **6.4 RESULTS FROM THE QUALITATIVE RESEARCH**

As mentioned in §5.5.2, the qualitative research of this study consisted of semi-structured interviews conducted with students from the experimental group. Figure 6.3 shows the network view of the qualitative research. From this figure it is evident that both positive and negative aspects regarding IM were identified from the qualitative data analysis. The positive aspects are all **part of** (as seen in Figure 6.3) IM and refers to the codes as listed in Table 5.13, namely: interest/enjoyment, perceived competence, effort, value/usefulness, relatedness and perceived choice. From Figure 6.3 it can also be seen that all of the positive aspects are **associated with** SDL which means that successive behaviour regarding these aspects refers to positive SDL readiness and skills (refer §1.1 and §2.5.4). Figure 6.3 also shows that CL and the five elements that is **part of** CL is not only **associated with** SDL but also with a number of the IM aspects, namely: interest/enjoyment, effort, value/usefulness, relatedness and perceived choice. The five CL elements (individual accountability, positive interdependence, social skills, promotive interaction and group processing) are intertwined in

the CL literature (refer §1.2.2 and §2.5.5). The relationship between IM and CL again became clear in the responses of the students, as discussed in the next sections.

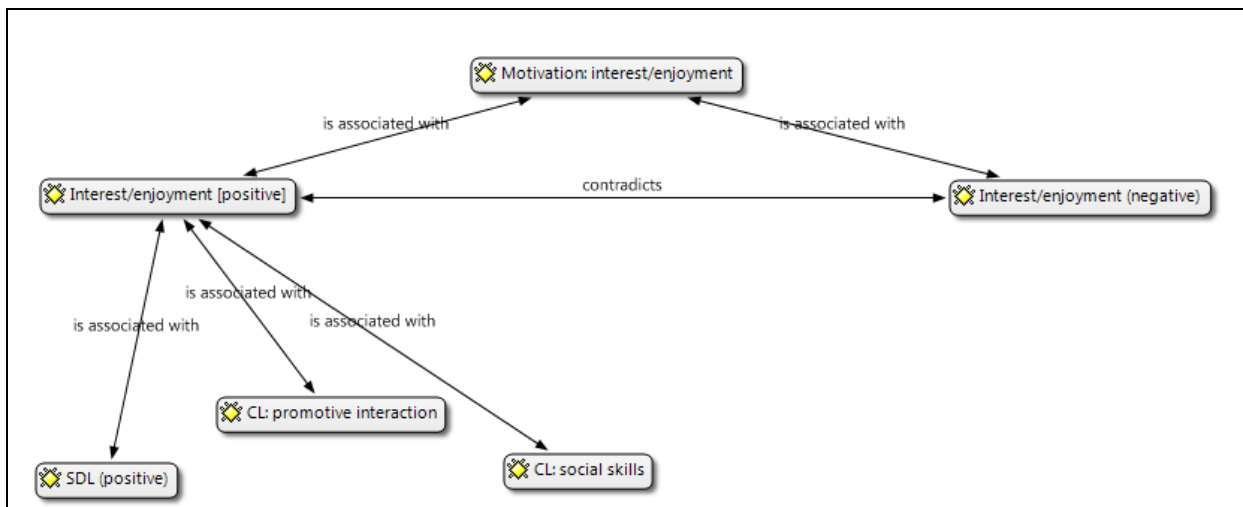
Figure 6.3 shows that only three negative aspects were identified, namely: SDL (negative), tension/pressure and perceived choice (negative). A few aspects that was **in contrast with** positive SDL readiness and skills were visible in some of the students. The same was identified for perceived choice (negative), which can be **associated with** the negative aspects of SDL. Tension/Pressure is theorised to be a negative predictor of IM (refer §5.4.3) which in the end is also **associated with** the negative aspects of students' SDL readiness and skills.



**Figure 6.3 Relationship network of intrinsic motivation**

## Interest/enjoyment

Figure 6.4 shows the relationship network view of interest/enjoyment. As seen in the discussion of Figure 6.3, the interest/enjoyment factor of motivation is associated with SDL, promotive interaction (refer §2.4.1.3) and social skills (refer §2.4.1.4). Literature links these aspects, and the relationships between them were again evident in the responses from the students.



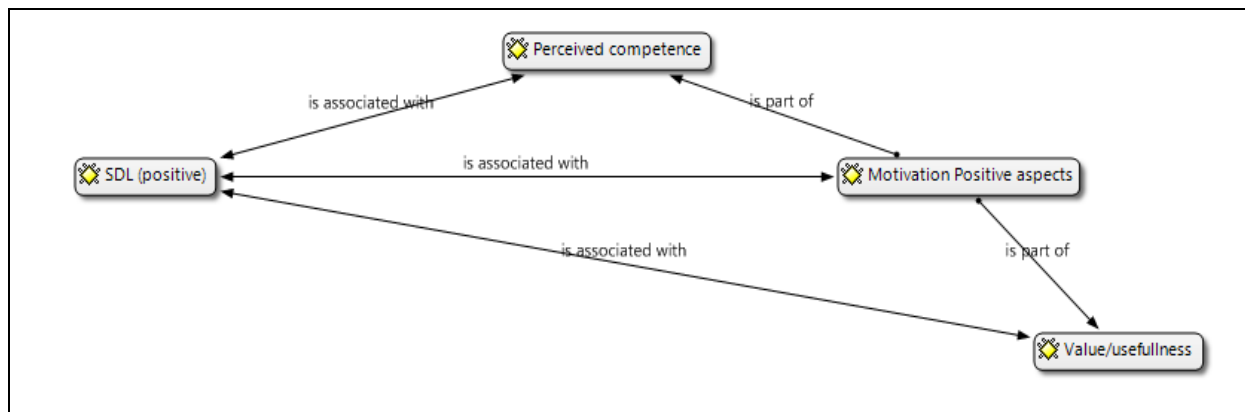
**Figure 6.4 Relationship network of interest/enjoyment**

From the interviews conducted with students (refer §6.3) that were part of the experimental group, it was evident that all of the interviewees were motivated to do well in the module and they enjoyed the work. The responses from all the students focused on positive aspects of SDL (refer §2.5.4). Student 4 said, “I was motivated to do well in this module... I liked and understood the work,” and Student 1 said, “I like economics, I like the work and wanted to do good”. As seen in the response of Student 2 and Student 6, the students especially enjoyed working in a group, which refers to the CL aspects of promotive interaction (refer §2.4.1.3) and social skills (refer §2.4.1.4) that were shown to have a positive effect on IM (refer §2.5.5). Student 6 especially enjoyed the group work and said, “Every time we did an assignment, we work together in our group...I enjoyed that”. Student 2 said, “It was fun to work together. When you get stuck, there is someone to help you... it makes the work easier”. Student 2 further said that “the more I enjoy the work, the more I’m motivated to do well”. Student 8 indicated that he was motivated by the fact that “the module was very interactive and the work was interesting”.

There was only one negative comment regarding this factor. Student 7 said that “When I chose economics, I thought I would be doing numbers and all that. So when I started ECON I did not know there was going to be so much theory, so I lost motivation”. From Student 7’s response, it is evident that it was the content of the module that demotivated the student and not necessarily the way in which the module was presented. Therefore, from the qualitative data, it seems that the overall experience of the students regarding interest/enjoyment was good and the students enjoyed the way in which the module was structured.

### ***Perceived competence***

Perceived competence refers to the students’ perspective of how competent they were to complete the activities throughout the duration of the module and how the completion of the activities influenced their perceived competence afterwards. Figure 6.5 shows the relationship network view of perceived competence. It shows that the students that commented positively on their perceived competence also showed good SDL readiness. They were prepared to work hard and do their part and they saw the value of the activities they had to do.



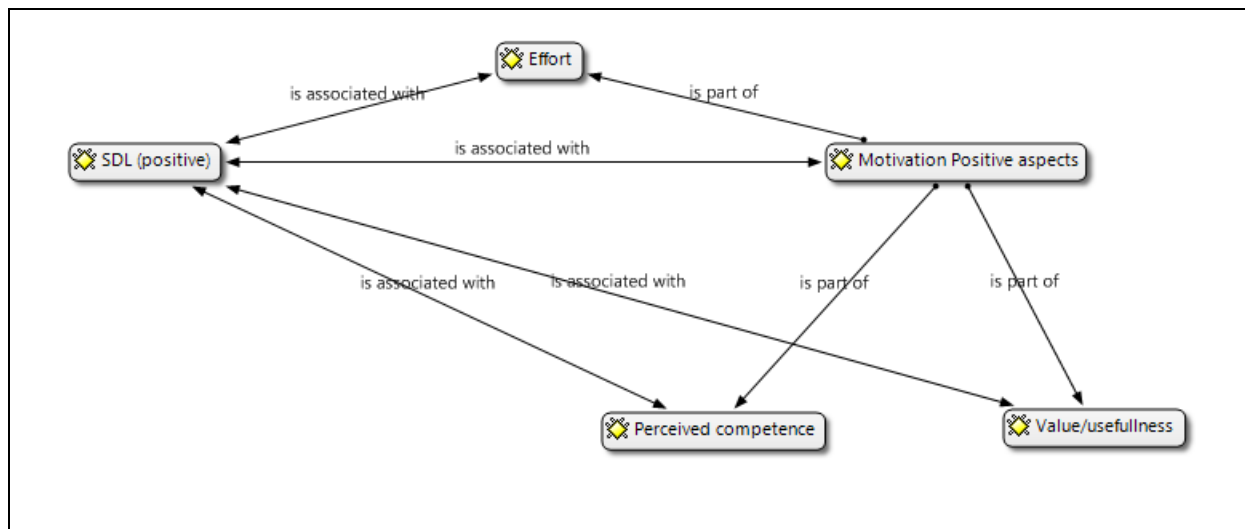
**Figure 6.5 Relationship network of perceived competence**

The responses gathered from the qualitative research indicated that the team challenge made the students feel that they were better prepared for the exam and it helped them to think about the work. According to student 2, “The team challenge helped us, especially in the exam. It made you do extra exercises of the important work and help us to understand the work better”. Student 3 stated that “it helped me a lot, I was better prepared for the exam”. Student 3 further stated that “I know I had to work harder...and give more attention to the module”. Student 9 felt that the team challenge “helped me to think about the work and I understood better after I did the assignments”. The fact that the students felt more competent

after completing the activities motivated them to work even harder. Student 2 stated that ...”it [the team challenge] had a good influence and it motivated you...” Therefore, from the qualitative data it is evident that the students that took part in the team challenge saw the value of the activities, it made them feel better prepared for the exam and it motivated them to work hard, which is also an indication of an increase in SDL (refer §2.5.4).

### **Effort**

This aspect of IM refers to the amount of effort that students put into activities and whether they only do it to finish in time or if they spend enough time on it so that they could do well and learn from the activities. Figure 6.6 shows the relationship network view of effort. It shows that the students who indicated that they put in effort to complete the activities did so because they realised that they will benefit from it in the long run and therefore saw the value/usefulness of the activities. These students also believed that by doing the activities they were better equipped for the further activities and exam, which refers to their perceived competence. All three of these aspects showed a positive relationship with SDL and it is evident that these students took responsibility for their own learning.



**Figure 6.6 Relationship network of effort**

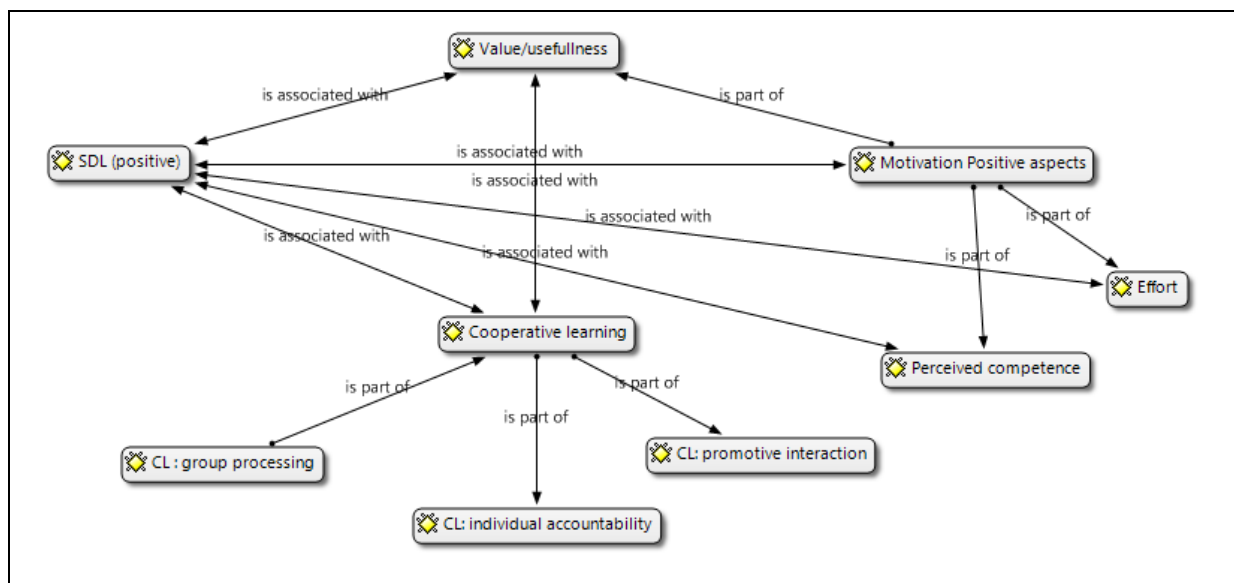
As seen in the responses of the interviewees (refer §6.3), the students had to do some research on their own and find extra information to be able to complete the activities from the team challenge. Student 4 agreed that this was helpful by saying that “we had to find out stuff for ourselves and do a lot of extra research ... not only did it help us to learn more about the subject but we also learnt more about the knowledge of human nature”. Student 1 agreed by saying, “We had to go and find other information. We had to do a lot of research before we

were able to do the group assignment...but if you're willing to do the work, you will be rewarded in the end." They really had to shift their boundaries. Student 3 stated that "when I realised the scope of the module and the amount of work we had to do, I realised that I will have to work harder to get the same marks as in the previous semester...the fact that I know I had to work harder motivated me". Student 3 further said that "the assignments focused on more than only what was written in the textbook. You had to do more research and ask other people if you don't understand...if you didn't take part, you wouldn't get that exposure". Although the workload was a bit more than they expected, they still saw the value of the team challenge and worked hard to achieve their goals. According to Student 2, "We had to do some extra exercises...if you didn't work hard, you will be of no use for the group...we all worked hard and we benefitted from it in the tests later on". Student 5 agreed by saying "it [the team challenge] helps you a lot, because you don't only learn the stuff that is in the textbook...it gives you a broader understanding of the work and it motivates you to go and read further and find out more".

From the responses of the students concerning this aspect of IM, it is evident that although they recognised that they had to work hard, find extra information and put in extra effort to be able to complete the activities they realised that they should work harder to succeed and that motivated them even more. The fact that they acknowledged the fact that they did not only study the work that was in the textbook to give them a broader understanding of the work is evidence of good SDL skills (refer §2.5.4).

### ***Value/usefulness***

Figure 6.7 shows the relationship network view of value/usefulness. It is clear from this figure that value/usefulness is not only associated with SDL and the two other IM aspects of effort and perceived competence, but also with three of the elements of CL. When students recognise the value of a task and realise that the task will influence their competence levels, it demonstrates good SDL skills, which again means they will most likely put in more effort to complete the task. CL is a vehicle through which this can happen, and it was evident from the students' responses that the CL activities had a positive influence on these aspects



**Figure 6.7 Relationship network of value/usefulness**

The responses gathered from the qualitative data suggests that the students could see the value of the team challenge. They realised that not only will they benefit in the exam, but they were also more exposed to further knowledge than the other students. They chose to take part in the activities because they felt that, in the long run, it will help them to understand the work better. Student 1 said that “we could really benefit from it. If you did it, you would have been prepared for the exam...if you did your work, and you would have been rewarded in the exam...it helped us a lot”. Student 1 further said that (when participating in the team challenge) “you learn stuff the others would not learn. You were more exposed...” According to Student 2, “It helped us a lot, especially in the exam... It helped you to do extra exercises of the important work so that you can understand it better”. It was evident from the responses that they had to put in effort to be able to complete the tasks, but they knew it was going to benefit them in the end.

The students also mentioned that they were expected to work in groups and that they sometimes were dependent on their team members to succeed. The fact that they had to think and work together helped them to understand the work better and motivated them to give more attention in class and to work harder. Student 4 stated that “this semester we work in groups a lot. In class the lecturer now had time to walk around and help us if we struggle. I was able to understand where everything came from and how it fits together. It helped us a lot to figure out the answers together... some of the assignments forced us to go and find what we’re struggling with and the group helped us to find the correct answers”. According to Student 5, “Usually when we did new work, you and your group could exercise it together

and you can discuss it with other people... if you sit on your own and the lecturer talks all the time, then you lose attention, but now we had to listen because you know that you have to discuss it with your group and do an exercise with them". Student 3 stated that "the group activities in the class motivated me to give more attention in class so that I'll be able to contribute in my group". These responses of Student 3, Student 4 and Student 5 are all relevant to the group processing (refer §2.4.1.5) and promotive interaction (refer §2.4.1.3) aspects of CL.

The students also indicated that the challenge and the group work helped them understand the work better. About the online activities Student 3 said the following: "It helped me a lot because it gave me the opportunity for more exercises of the work and helped me prepare for the tests and exam...it helped me to study and work harder...you can ask someone if you struggle and if you see the others (in your group) work hard, you realise that you have to work harder as well if you want good marks". Student 6 explained that they were motivated to take part in the group activities and get high marks by saying: "I was motivated to do it...and it was my goal to get like really high marks and participate in the group". Student 7 agreed by saying, "It was useful. They get to test your understanding with regard to whatever they taught in class... I was totally aware of that there are no marks, so I did it anyways, because I know it was going to benefit me." Student 8 said that "I think it was a positive experience...it gives you a better understanding of the work". According to Student 9, "It really helped me to understand the chapter better after I did the assignments". They all agreed that the fact that they did their part in the group assignments, struggled together in their groups and were able to ask someone if they were stuck helped them to understand the work better and it benefit them in the exam. The realisation of the value of the activities regardless of whether it counts for marks or not is a strong indication of positive SDL.

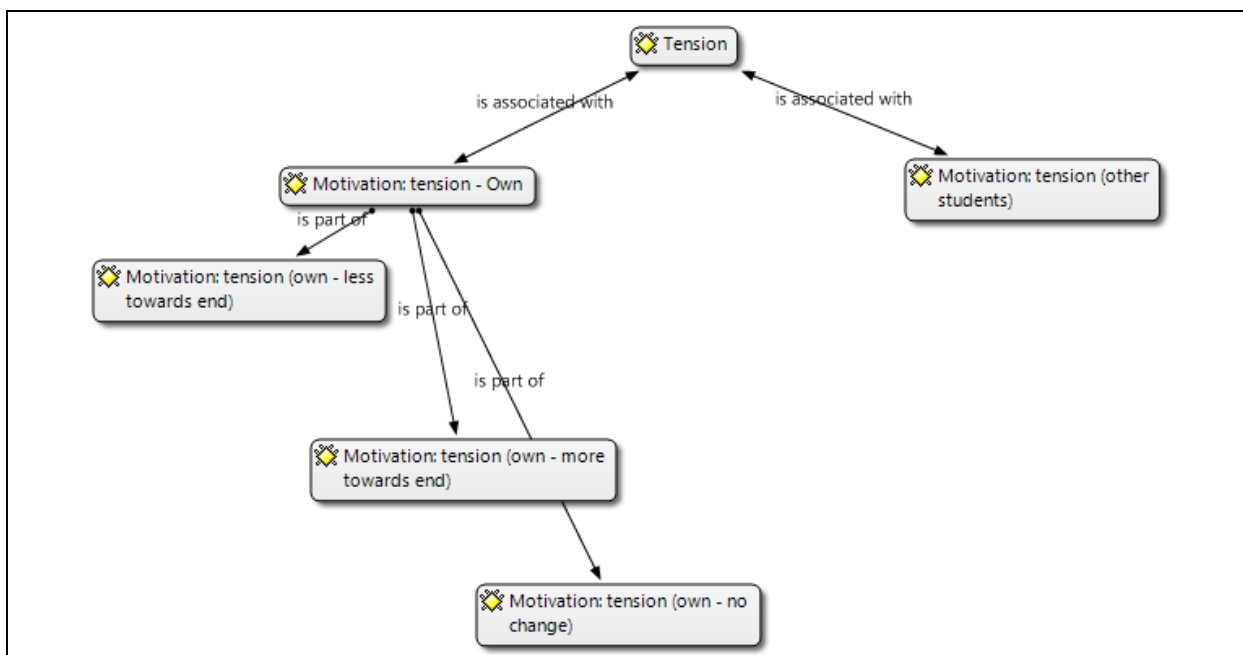
The group work also motivated them to perform better, because they did not want to disappoint their group members. Student 2 said that "it [to be part of a group] motivates you a lot because you know when you get back to your group you'll have to be able to answer questions and understand what's going on... the assignments were good and it helped you to think a bit deeper than the surface". Student 5 stated that "you realize that you have a responsibility to do your part...it motivates you to do your part if you see that the others in your group also work hard... It also motivates you to read up more on your own... and this helped us a lot in the exam". Student 5 also explained that "as part of the one exercise, we had to make a summary then I didn't have to do it again for the test. So I decided that we will do things like this in all the assignments and I don't have time before each test to summarise

the work. That’s why I did it. I saw it would make my work easier.” This again refers to the individual accountability (refer §2.4.1.2) aspect of CL.

The fact that the students were motivated to partake in the team challenge, that they could see the value and usefulness of the activities and put in effort to complete the tasks is an indication of positive SDL skills (refer §2.5.4).

**Tension/Pressure**

Figure 6.8 shows the relationship network view of tension/pressure. The figure shows that in this aspect of the interviews the students were expected to comment on the possible reasons for the high tension/pressure levels throughout this module in general (motivation: tension – other students). They were also expected to indicate whether they personally experienced it in the same way as the other students (motivation: tension – own). Their own experience would relate to any of the following three scenarios, namely: tension/pressure levels remains the same throughout the duration of the course, tension/pressure levels were higher towards the end of the course or tension/pressure levels were lower towards the end of the course.



**Figure 6.8 Relationship network of tension/pressure**

The quantitative data indicates that most of the students experienced a high level of tension/pressure during the course of this module, and even higher towards the end of the module. The interviewees were asked why they think the overall tension/pressure levels of the students were high. Several aspects were mentioned that might have an influence on the

students' tension levels. The first is the fact that the workload is much more towards the end of the module. Student 1 felt that "the work got more difficult and you have to start studying for the exam for all your subjects". Student 2 agreed by saying, "The quantity and type of work, economics is one of our most difficult modules". Student 4 also thinks "the quantity of work" was the reason. Student 5 stated that "everything is coming to a point and what you do in the exam will determine if you pass or not". According to Student 7, "The work piles up, so at the end of the semester you realise there is so much to be done".

The second aspect that might have influenced the pressure and tension levels of the students, according to the interviewees, was that the students were getting worried about the exam and they felt that they were not fully prepared. Student 3 said that "I think the closer they got to the exam, they realised they don't know what is going on in the module". Student 6 felt that "it is really challenging and they didn't know what to expect from the exam".

A third possible reason given for the high pressure and tension levels at the end of the semester was the fact that some of the exams were postponed because of student strikes that were taking place country-wide that also disrupted classes on the NWU campuses. Student 6 further said that maybe they did feel more tense towards the end of the module because "...now the exams are postponed right? And there was the student strike going ...but it was mostly what was happening around the campus because a lot was happening maybe that caused like more tension at the end of the semester because now it's more challenging now and we had to postpone exams and stuff".

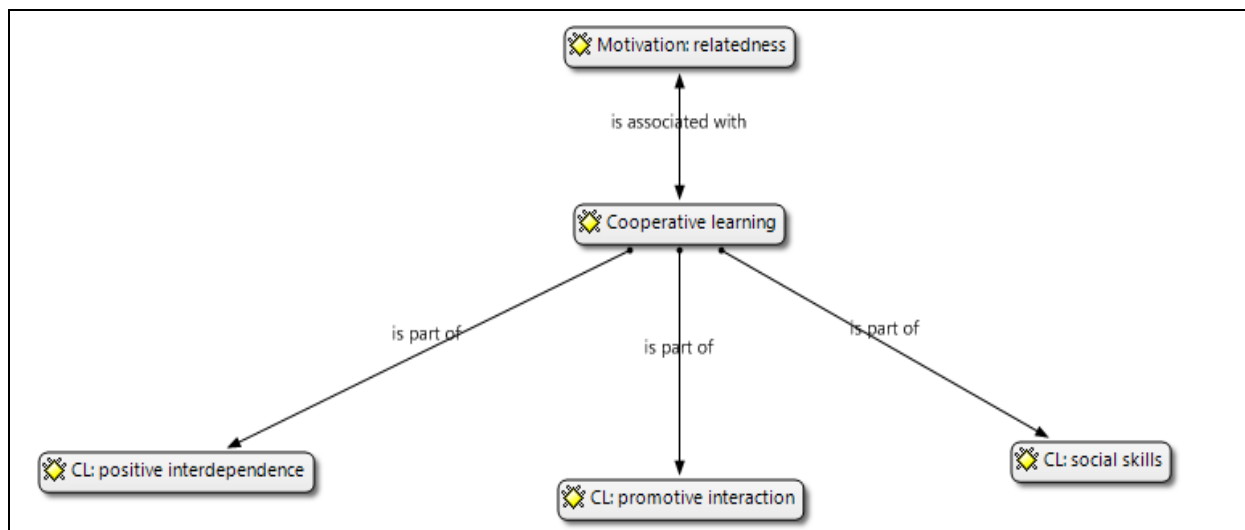
When the students were asked if they experienced it in the same way as the rest of the students, only two of the students agreed and felt that they were more tense at the end of the module. According to Student 1, "I experienced less tension at the start of the module. At the end of the module, the work got much more difficult... If you make one mistake in a calculation, you lose all the marks...that makes you stress more". Student 7's reason was "the work load, the work piles up, so at the end of the semester you realise there is so much to be done, yes". The rest of the students felt that although they did feel some pressure, it wasn't necessarily higher at the end of the module. According to Student 2, they "didn't stress too much about this module. The work is interesting and I enjoyed it". Student 3 agreed by saying, "I go to class and do my work. The more you went to class, the more tips you got. I knew what was expected of me and I have no reason to stress for the exam". Student 4 replied that "I enjoyed the module and had economics at school, so it wasn't too difficult for me". According to Student 5, they "felt pressure, but I won't say it was more

towards the end of the module”. Student 9 said that “It was stressful, but economics wasn’t my most difficult module, and therefore I stressed more about the other subjects”.

Therefore, regarding the pressure/tension aspect of IM, two aspects were identified that might have an influence on the students’ higher tension levels. The first is the fact that the workload is much more towards the end of the module, and the second, that the students were getting worried about the exam. Most of the students that participated in the interviews felt that they did not experience any change in their stress levels towards the end of the module. They felt that they were well prepared for the exam and knew what was expected of them, and therefore had no reason to stress about this module.

### **Relatedness**

From Figure 6.9 it is evident that the IM aspect of relatedness strongly related to CL. Since relatedness focuses on the relationship and trust between team members, it encompasses the positive interdependence, social skills and promotive interaction elements of CL.



**Figure 6.9 Relationship network of relatedness**

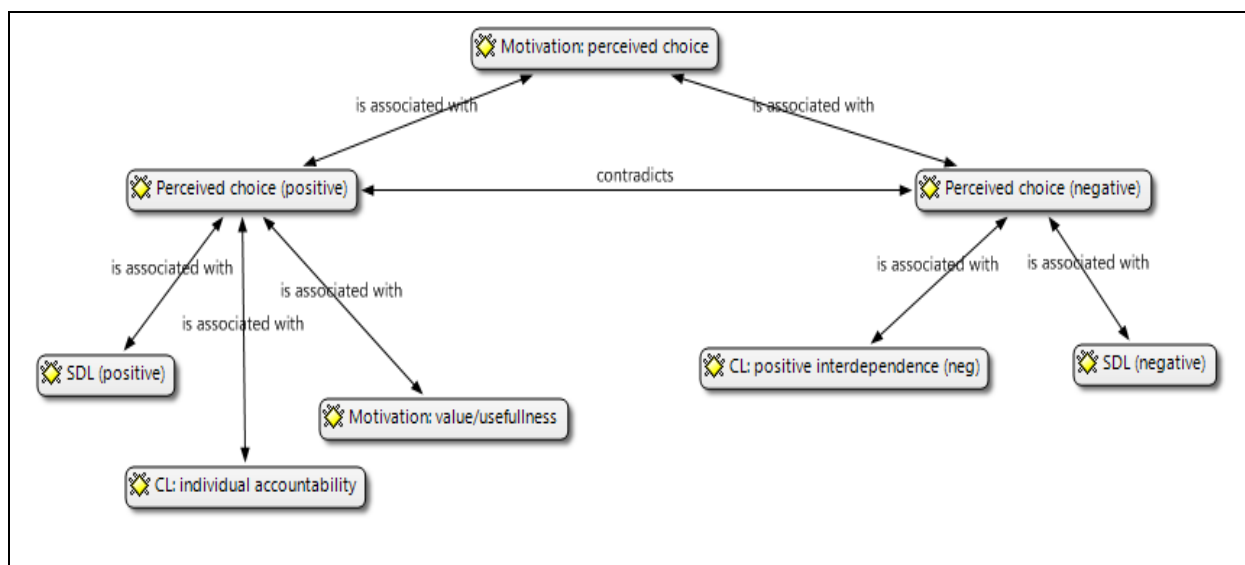
According to the students’ responses, they seemed to have worked well together, they enjoyed the interaction with their group members and they felt that the members of the group complemented each other.

According to Student 2, “The strengths of the one might be the weakness of the others. We complemented each other...it was really nice to work together...” Student 3 asserts that “sometimes we struggled to get hold of one another, but in the end arranged to meet and then worked well together”. Student 5 agreed by saying they “struggled to find each other...”

when we were together at last, it was fun. Everyone was friendly and worked hard...it was not awkward at all". These aspects relates with the positive interdependence (refer §2.4.1.1), promotive interaction (refer §2.4.1.3) and social skills (refer §2.4.1.4) aspects of CL that was shown to have a positive effect on IM (refer §2.5.5). The following two comments was specifically aimed at the groups they chose themselves. Student 6 said that "we worked like really good together and we managed to finish in time ... so it was a good experience". Student 8 felt that "my group was fine, quite intelligent and we understood each other...we didn't have any problems". Student 9 was also happy with the group "There was great teamwork and we got good marks". It can be said that although the students from the experimental group might have worked well with their group members, they did not indicate that they connected on a social level and would not necessarily have spent time with them after they completed the challenge.

### **Perceived choice**

Figure 6.10 shows the relationship network view of perceived choice and shows that the interviewees focused on both positive and negative aspects. The negative aspects were mainly associated with not only the negative aspects concerning the positive interdependence principle of CL but also the negative aspects of SDL. The positive aspects concerning perceived choice were found to have a positive relationship with SDL and the individual accountability principle of CL. The students who commented positively on this factor could also see the value/ usefulness of the activities and demonstrated positive SDL skills.



**Figure 6.10 Relationship network of perceived choice**

The responses from the interviewed students focused on positive aspects of SDL (refer §2.5.4). Even though the challenge was optional and some of the activities did not count towards their participation marks, these students still chose to take part in the challenge. It is evident from their responses that all these students saw the value of the team challenge. They felt it prepared them for the exam and gave them more exposure. They all saw that it was their own responsibility to do their part in order to do well in the module, which refers to the individual accountability aspect of CL (refer §2.4.1.2) which was shown to have a positive effect on IM (refer §2.5.5).

When students were asked how they felt about the fact that they could choose whether they want to partake in the online challenge or not, the following responses were recorded. Student 3 indicated that they enjoyed the fact that they could choose whether they want to take part in the team challenge by saying, “If you choose if you want to take part in the team challenge, you get the chance to work with other people that actually wants to do the work... it influenced how well you were going to do in the module. If you didn’t take part, you wouldn’t have gotten the exposure we did”. Student 3 also said that “It taught you more self-responsibility. The fact that you are now part of the grown-up world and you can’t just do stuff because you get marks for it. It just means that you will have to work harder for the marks you want”. Student 5 also explained that “as part of the one exercise we had to make a summary then I didn’t have to do it again for the test. So I decided that we will do things like this in all the assignments and I don’t have time before each test to summarise the work. That’s why I did it, I saw it would make my work easier.” Student 6 asserts that “I was totally aware of that there is no marks, so I did it anyway, because I know it was going to benefit me”. Student 7 agreed by saying, “I was motivated to get involved in it because I knew if I didn’t then I would lose marks in the end of the day... and I really wanted to get good marks in Economics”. Student 8 “saw this as facilitation. It helps you so much and it is does not necessarily have to count marks...I think it was a positive thing that we had a choice”. All of these responses are evidence of growing self-direction in their learning.

Although most of the students indicated that they found it positive that they could choose whether they want to take part in the team challenge, a few of the students mentioned some negative experiences as well. Student 1 said that “I liked the fact that you could choose. If you are not willing to do the work, you have to take the punch for it... you will benefit from it and you will get rewarded in the end...it helped us a lot in the exam...even if we did not get mark for the assignments”. But Student 1 further said that “in the end we started to lack a bit, especially with the last assignment that was so close to the exam. We thought it would be

time better spend to start preparing for the exam. When I think back now, it would have been nice to get marks for your effort, especially if you need those marks to pass in the end... it would have been nice". Student 4 said that "because they [her group members] thought it didn't count marks, they didn't want to put in that much effort...I think the activities were good, but because of the marks my group members did not want to give their best". According to Student 5, "In the beginning I worked very hard but when I heard it was not for marks, I spent a little less time on in....but if you did the assignments on eFundiTM, it helped you a lot in the exam". Student 6 said that "if we got marks for it then we would have been more motivated to get involved".

The fact that they did not receive marks for the challenge seem to have bothered some of the students. As seen from the responses of Student 2 and Student 9, the students' IM were influenced negatively by the fact they did not receive marks. Student 2 felt that the workload got a bit much at the end of the semester and said that "because the work got a bit much closer to the exam, and we had to start studying, I had to choose whether I will actually do the last team challenge assignment or just go through it... Because there was more important work to do, I was less motivated to do the assignment". Student 2 further stated that "If I have to choose between something that counts marks and something that didn't... I'll choose the one that counts marks". Student 9 agreed by saying, "I tried to stay involved... but because we didn't receive marks for it, I wasn't motivated...because it was an extra thing to do...I felt that I didn't really benefit from it." They could not see that the challenge will still benefit them in the long run and only saw the fact that there was not an immediate rewarded for their work. However, as seen in the paragraphs above, most of the students indicated that they were motivated to take part in the team challenge regardless of the fact that they did not receive marks for the challenges.

Student 4 was motivated to participate in the team challenge at the beginning of the module. However, it seems that her team members did not share her interest and that she and some of her team members did not see eye to eye. Student 4 also felt that they would prefer to choose their own team members "I think because I didn't know my team members and I didn't know how they worked, it made me a bit negative, especially when I had to work harder in the end because everyone is not always doing their share... This is a bit demotivating... I think it would be better to choose your own team, then you know your team members will do their part". According to Student 4, her group didn't want to put in as much effort into the activities that they did not receive marks for. This not only reflects negative on their IM (refer §2.5.4) of the team members but also indicates a negative effect on positive interdependence (refer §2.4.1.3) within the CL group. Another negative aspect that Student 2

mentioned was the fact that their workload was too high by the end of the semester and they decided to spend more time on assignments that do count marks or to prepare for the exam. However, most of the interviewed students could see the value of the team challenge and were still motivated to complete the activities for personal gain.

## **6.5 CONCLUSIONS FROM THE COMBINED ANALYSIS**

From the quantitative data analysis it was found that there was no concrete change in any of the groups between the pre-tests and the post-tests regarding most of the IM factors, except for the relatedness factor in the experimental group. However, in the following cases a medium effect size was recorded:

### ***Control group C<sub>1</sub>***

This group refers to the students that attended Lecturer A's classes in year one of the study

These students showed an increase that was of medium practical significance in their tension/pressure levels from the beginning to the end of the module. This difference could be attributed to the fact that it was a rather difficult module, the workload for the module was quite high, the content of the module was unfamiliar and the post-test was conducted close to the exam.

This group also showed a decrease in the perceived choice factor that was of medium practical significance. Since this group underwent no intervention and the activities and work they had to do all contributed towards their participation mark, they did not really have a choice whether they wanted to participate or not. If they did not participate, they would not have been able to pass the module and their responses regarding this factor is understandable.

The last factor in which this group underwent a difference of medium practical significance was with the increase of SDL skills. Their SDL skills measured slightly higher towards the end of the module. Since this students is first year students and they had to adopt to the tertiary environment, it is possible that their natural growth rather than the way in which the module was presented could have influenced the change in their SDL skills. Because the tertiary environment expect them to take more responsibility of their own learning, they were forced to adapt if they wanted to succeed.

### ***Control group C<sub>2</sub>***

This group refers to the students that did not attend the classes of Lecturer A in year one of the study. The students from this group showed an increase that was of medium practical significance in their tension/pressure levels from the beginning to the end of the module. This difference could be attributed to the same reason as for group C<sub>1</sub>. Their SDL skills measured slightly higher towards the end of the module. This change could also be related their natural growth rather than the way in which the module was presented could have influenced the change in their SDL skills

### ***Control group C<sub>3</sub>***

This group refers to the group of students that did not attend the classes of Lecturer A in year two of the study. As with the students for group C<sub>1</sub>, this group also showed an increase that was of medium practical significance in their tension/pressure levels from the beginning to the end of the module. The same reasons mentioned above can be argued for this change.

This group also showed a decrease in the interest/enjoyment factor that was of medium practical significance. This specific module is a compulsory module for most of the BCom courses. Therefore, the students could not choose the module because they showed interest in this specific field of study. It might be that most of the students were rather negative about the module from the start, and the high workload, difficulty and unfamiliarity of the content contributed to the fact that they did not enjoy the module.

The last factor in which this group underwent a difference of medium practical significance was a decrease of perceived competence. The same reasons as stated with the decrease in interest/enjoyment can be debated for this change.

### ***Experimental group E<sub>1</sub>***

This was the group that underwent the intervention and attended Lecturer A's classes. As with most of the other groups, this group also showed an increase of medium practical significance in their tension/pressure levels from the beginning to the end of the module. This difference could also be attributed to the fact that it was a rather difficult module, the workload for the module was quite high, the content of the module was unfamiliar and the post-test was conducted close to the exam.

This group also showed a decrease in the relatedness factor that was of high practical significance. Because this was the only group that was expected to work in groups, it made

sense that no change was recorded from other groups. The students from this group were taken out of their comfort zone by putting them into randomly selected work teams. Most of the time they never met their fellow team members before. The relatedness factor focus on aspects such as relationship and trust between team members, and not only on if they worked well in their groups during the team challenge but also if they think the fact that they were grouped together opened the chance to future friendship relationships. The high decrease in this factor does not necessarily mean that the students did not work well in their groups. It might be an indication that they prefer working with people they know and that they did not feel that future friendship were being established by working in these groups.

After the quantitative research had been analysed, interviews with students from the experimental group were conducted to gain a better understanding of the quantitative data. Although from the quantitative data it might seem as if there were no memorable changes in the students' IM and SDL, it did show that there was a tendency that the students from the experimental groups measured a bit higher in most of the factors in the post-tests (refer §2.6.2). This, together with the responses gathered from the qualitative research, could be an indication that even though it was remarkably small, the intervention did influence the IM and SDL of those students.

From the quantitative data, it was evident that the students' tension/pressure levels were quite high throughout the semester, and even higher towards the end of the semester. The possible reasons for this was discussed earlier in this section. From the interviewees' responses, they also felt that the fact that the post-test was done close to the exam when students are naturally more stressed, the fact that students realised that they have masses of work to master in a short time, and the difficulty of the work in this module may have contributed to high tension/pressure levels. However, most of the students that took part in the team challenge felt that they did not feel more stressed towards the end of the module. They felt that they were well prepared for the exam and they knew what was expected of them.

The interviewed students indicated that they enjoyed the module and they especially enjoyed working in groups. They felt that the group work made the work easier and there was always someone to ask help from. They realised that they had to work hard and do their part, not only for their own gain, but also because their group members depended on them. Some of the students mentioned that although the group dynamics were usually good, towards the end of the module when their general workload became more, some of the team members were starting to lack and would not always do their part. This might be the reason why the

students would prefer working with friends that they know they can trust. Although most of the interviewees were not influenced by the fact that they did not receive mark for the activities, they felt that it might have contributed to the fact that some of their team members started to fall behind. The students said that because the assignments did not contribute towards their participation mark, some of the team members would rather choose to put time and effort into the activities that did count marks. However, the students still felt that the fact that they had to work in groups was a positive experience, it motivated them to do well and it helped them to master the work.

From the interviews it was evident that the students could see the value of the team challenge. Although the students mentioned that it would have been nice to receive marks for their efforts, they realised that by participating in it and putting in effort to complete the extra activities, they would benefit from it in the end. They were motivated to do well and they were prepared to do the work now and see the reward at a later stage.

As seen in the discussions above, most of the students who took part in the interviews showed good SDL skills. All of them chose to take part in the challenge regardless of whether it counted towards their final marks or not. They saw that by taking part in the challenge, they will benefit from it in the long run and it will expose them to opportunities that assist them to explore their knowledge and skills. The students realised that by working together in groups, they could help each other to achieve the outcomes without having to wait for the facilitator to assist them. The students were motivated to do their part, to learn more and to achieve good results. They understood that it is their own responsibility to excel and perform in the module and they were willing to do whatever it takes to do so.

## **6.6 CHAPTER SUMMARY**

In this chapter the findings from the quantitative and qualitative research were reported on and discussed. The data from the statistical tests, i.e. independent t-tests, dependant t-tests and ANCOVA, were analysed and interpreted for year one and year two respectively. From the quantitative data, it was found that the experimental group showed an increase that was of medium practical significance in their tension/pressure levels from the beginning to the end of the module. This group also showed a decrease in the relatedness factor that was of high practical significance. The reasons for these finding were discussed in §6.5. Although from the quantitative data it might look that there was no notable changes in the IM and SDL of the experimental group, it showed that there was a tendency that the students from the experimental group measured a bit higher in most of the factors in the post-tests (refer

§2.6.2). However, the value of the team challenge was confirmed by the analysis of the qualitative interviews, and conclusions were reported on in terms of the relationship between the qualitative and quantitative data.

## **CHAPTER 7**

# **CONCLUSION AND RECOMMENDATIONS**

### **7.1 INTRODUCTION**

This study aimed to evaluate the influence of cooperative learning (CL) in a blended learning (BL) environment on students' intrinsic motivation (IM) and self-directed learning (SDL). In order to achieve this aim, the following sub-aims were pursued:

- i) To identify how CL could improve intrinsic motivation.
- ii) To investigate how CL strategies can be adopted for a BL environment.
- iii) To determine the influence of the adopted CL strategies on IM and SDL in a BL environment.

In this chapter, the conclusions regarding the literature study and the empirical research will be discussed in terms of the aim and sub-aims of the study.

The empirical research was conducted over two years on the students enrolled for the first year economics module ECON 121. The students from the first year of the study (2014) and a group of students from the second year (2015) were used as the control groups. The students attending the classes of Lecturer A in 2015 were used as the experimental group and underwent an intervention in the form of a team challenge that was designed in a CL-BL environment. Both the control groups and the experimental group completed an IM and a SDL questionnaire at the beginning and again at the end of the module. Follow-up interviews were conducted with a smaller sample of the experimental group to enrich and clarify the quantitative data.

### **7.2 CONCLUSIONS**

In the following sections, the conclusions regarding the sub-aims of the study are discussed.

### **7.2.1 Conclusions for sub-aim one: to identify how cooperative learning could improve intrinsic motivation.**

In Chapter 2 of this study, a literature review of CL and its implementation was conducted and aspects were identified that can help to promote IM. The findings of how CL can be implemented to improve IM is discussed below in terms of the following questions: (a) What does CL entail? (b) What does IM entail? (c) How can CL improve IM?

#### **7.2.1.1 *What does cooperative learning entail?***

CL originated about 300 BC when Socrates taught his students in small groups and encouraged them to engage in dialogues. The roman philosopher, Seneca, also advocated CL by stating that when you teach, you learn twice. The history of CL continued through the 17<sup>th</sup> century, when Comenius, a pedagogical reformer, also emphasised that students can learn more by teaching others than by only being taught. In the 18<sup>th</sup> century, Lancaster and Bell opened schools to investigate the use of peer learning, and in the 1900s John Dewey advocated the employment of peer learning. Although these ancient philosophers did not coin the term CL, their teaching methods and pedagogical views on how knowledge should be constructed pointed to what we now know as CL. In the last three decades (1980s to early 2000s), David and Roger Johnson did most of the influential work in CL. Even though an immense number of CL studies by other researchers can be found, they are currently viewed as the leaders in this field of study (refer §2.2).

Research on CL has been guided by four theoretical perspectives, namely: (a) social interdependence theory, (b) cognitive-developmental theory, (c) behavioural learning theory and d) motivational theories (refer §2.3). This study shares all of the above mentioned views especially that of Vygotsky from the cognitive developmental theory that suggests knowledge is a societal product which is constructed from cooperative efforts to learn, understand and solve problems. By incorporating CL in the intervention, the process of socially constructing knowledge was used to guide the students to become more self-directed and intrinsically motivated. The motivational theories perspective also played a large role in the design of the intervention. Motivationalists believe that cooperative structures create a situation in which the only way group members can attain their own personal goals is if the group is successful. Both these theories also closely relates to the social constructivist paradigm adopted and implemented throughout this research process.

Founded in the social independence theory above, Johnson and Johnson (1994) identified five basic elements of CL, namely: (1) positive interdependence, (2) individual accountability,

(3) promotive interaction, (4) social skills and (5) group processing (refer §2.4.1). When these elements are properly implemented, group collaboration in the classroom can increase learning and achievement, social skills, self-esteem and attitudes toward classmates and school (refer §2.4.1). To investigate the successful implementation of CL, the role of the facilitator in CL was identified (refer §2.4.2). The discussion differentiated between formal and informal CL. Formal CL refers to students working together in groups for a specific time that can vary from one single class period to several weeks. In formal CL, facilitators are responsible for specifying the lesson's objectives, making pre-instructional decisions, explaining the assignment and the importance of working together, serving as a facilitator offering assistance when necessary, and assessing students' learning. Informal CL refers to students that work together to achieve a joint learning goal in temporary, ad-hoc groups (refer §2.4.2). In informal CL, tasks given to students must be explicit and the instructions detailed and precise. The groups should be expected to produce a specific product such as a written answer or verbal feedback and the facilitator should move through the class to observe and listen how well students understand the concepts and material. In the intervention for this study, both formal and informal CL were used (refer §2.4.2).

A number of CL techniques were discussed to give practical guidelines on how CL should be implemented in the classroom (refer §2.4.3). Some of the more well-known teaching strategies were specifically focused on, namely (a) think-pair-share, (b) student teams-achievement divisions, (c) jigsaw and group investigation. From the discussion of these CL techniques, the gap between the theory and practice of CL were narrowed. Throughout the literature review, the benefits of CL were evident. Benefits vary from intellectual benefits such as the use of higher order and critical thinking skills, to social benefits which entails the interpersonal skills and the opportunity to learn how to understand the perspectives and opinions of other individuals. A few psychological benefits such as building self-esteem in students as well as encouraging students to seek help and accept tutoring from their peers were also identified.

### **7.2.1.2     *What does intrinsic motivation entail?***

Motivation is defined as the process by which goal-directed activity is instigated and sustained. Motivational research are led by two main historical theories, namely behavioural and cognitive theories. The conceptualisation of motivation from these two main movements has important educational implications. Behaviourists imply that facilitators should arrange the environment in a way that students can respond properly to a stimulus, while cognitive

theorists believe that the facilitator also needs to consider the students' mental processes and not only how they behave (refer §2.5.1).

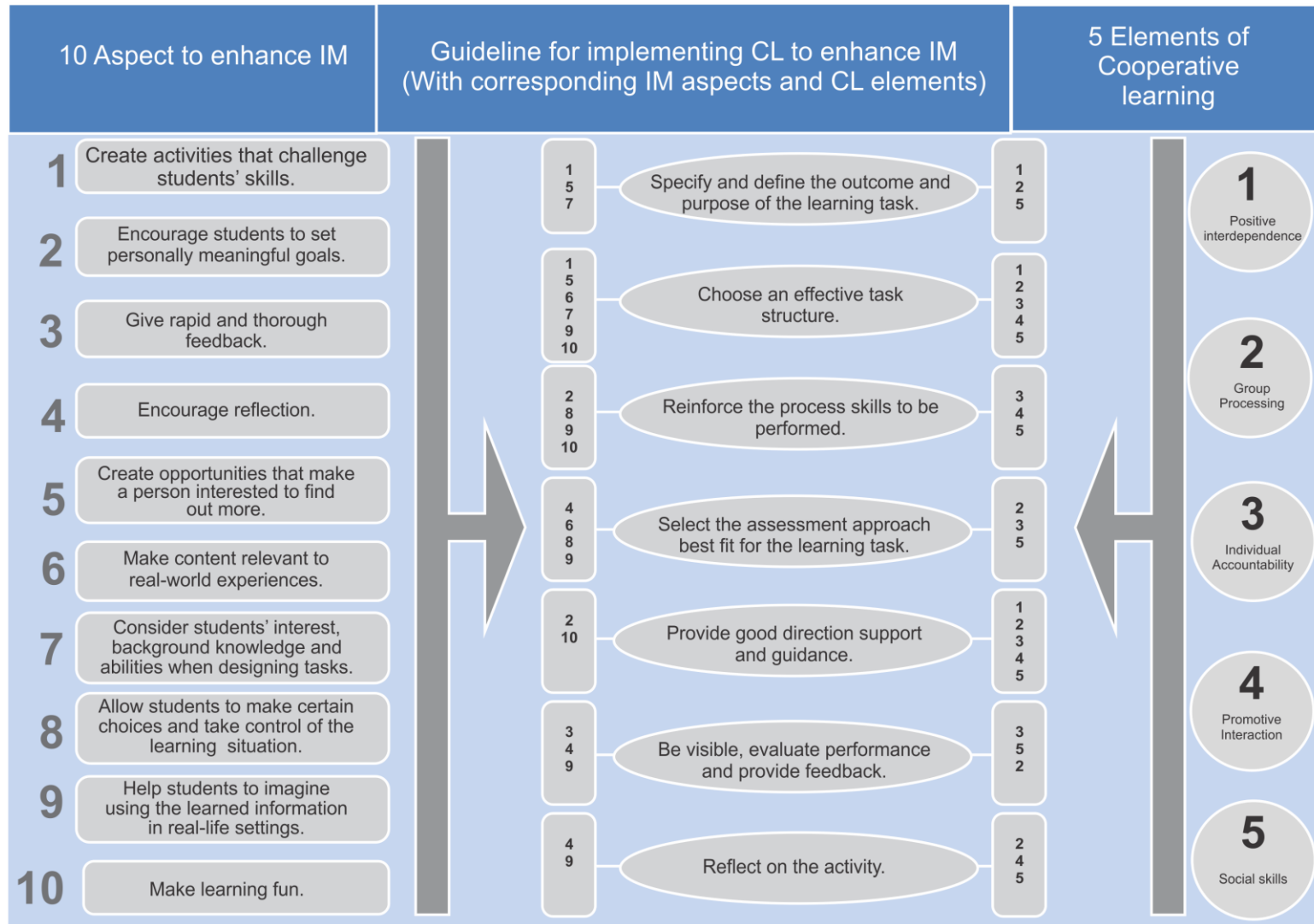
When people are intrinsically motivated, they act for their own sake because they find working on the task enjoyable. Intrinsically motivated students learn because they are curious about the content and they feel challenged by the learning activity. Because IM comes from within and students are diverse in their own ways, it is a difficult task for facilitators to develop student motivation in a learning environment. However, studies done by Lepper and Hodell (1989), Moore (2005) and Sengodan & Iksan (2012), amongst others, found that it is possible to enhance IM in the classroom by helping students realise their personal goals, values and interests (refer §2.5.3). Lepper and Hodell (1989) identified four major areas that lecturers/educators could attend to when planning their learning environments to enhance intrinsic motivation, namely: challenge, curiosity, control and fantasy. When implementing CL in a classroom to improve IM and SDL, the role of the lecturer/educator changes to that of a facilitator. Therefore, in order to successfully plan the intervention for this study, the role of the facilitator to enhance IM regarding each of the above-mentioned areas was determined and discussed (refer §2.5.3.1-2.5.3.4). From this discussion, a synthesis of numerous studies was done to identify ten aspects that facilitators could implement in their learning environments to enhance IM (refer §2.5.3.5, Table 2.1). However, the above-mentioned aspects do not favour any learning environment or teaching-learning strategy. Therefore, to be able to reach sub-aim one of this study, it is necessary to determine how CL strategies can be used as the vehicle to implement these aspects in the classroom.

### ***7.2.1.3 How can cooperative learning improve intrinsic motivation?***

The link between CL and motivation is common in both CL and motivational literature. As seen in §2.5.5, CL ultimately results in better learning because the process of cooperation prompts motivation and consequential cognitive activities. It is also assumed that as students become more engaged in their learning, their motivation increases. In a study done by Wang (2012), it was found that by using CL techniques students' motivation improved. Wang believes that the improvement in motivation was a result of 1) the increase in self-efficacy, 2) experiencing success, 3) setting group goals and 4) a positive relationship with classmates.

Wang's findings were supported by a number of other CL researchers (refer §2.5.5). The literature review made it evident that when CL is implemented according to the five elements identified by Johnson and Johnson, the student becomes more engaged in their learning and

their motivation increases. From the discussion lead by Wang's findings, a synthesis of numerous research that link CL and IM were done and a number of guidelines were compiled for designing a CL environment to enhance IM (Table 2.2). In §2.5.6.1-2.5.6.7, the practical implementation of each of these guidelines and their link to the five elements of CL were discussed. It was also evident that the ten aspects identified to enhance IM, as discussed in the previous section, can be integrated into the CL-IM guidelines. As seen in Figure 7.1, the 10 aspects identified to enhance IM and the five elements of CL should be used in conjunction with the CL-IM guidelines. Therefore, when implementing each of these guidelines, the corresponding IM aspect and the CL elements should be used to refine the practical implementation of the guideline.



**Figure 7.1 Guidelines for implementing cooperative learning to improve intrinsic motivation**

## **7.2.2 Conclusions for sub-aim two: to investigate how cooperative learning strategies can be adopted for a blended learning environment.**

In the previous section, a list of aspects that helps to promote IM were compiled. This list was combined with the basic elements of CL into a new list that shows how CL could be used to improve IM. This list did not focus on CL in a BL environment, but on learning environments in general. Therefore, Chapter 3 of the study focused on implementing CL in a BL environment to enhance intrinsic motivation. To do so, the researcher had to determine: 1) what does BL entail? And 2) How to implement CL in a BL environment?

### **7.2.2.1 *What does blended learning entail?***

BL can occur at many different levels (refer Figure 3.1) and the stakeholders will differ for each level. In finding a definition for BL that is suitable for this study, it had to be established on what level blending took place in the context of this study. Thus, for the purpose of this study, the Bonk and Graham (2006) definition of BL on course level was accepted which reflects the idea that BL is the combination of two different models of teaching and learning, namely traditional face-to-face learning and online learning, each with their own historical background, learning strategies, strengths and weaknesses. There are many reasons why a blended approach to learning might be selected. The increase in access and flexibility for students, increased level of active learning, and achieving better student experiences and outcomes are only a few to mention (Gliner et al., 2002; Graham, 2009).

To further explore BL, it is important to understand that BL happens along a continuum. In some cases the main mode of delivery will be face-to-face, where the online component only complements instruction, while other courses focus more on online instruction and only have limited contact time. The International Association for K-12 online learning summarised BL in a continuum to give facilitators an idea of the many ways in which online learning can be blended with face-to-face instruction (refer Figure 3.2). This continuum stretch from stage 1, which represents a fully online curriculum with options for face-to-face instruction, to stage 5, which represents a face-to-face classroom instruction mode with limited or no requirements for students to be online. A further classification for BL was done by Stalker and Horne who compiled a BL taxonomy that categorises four possible combinations of different models of BL (refer Figure 3.3), namely the rotation model, flex model, self-blend model and enriched-virtual model. The rotation model focuses on student rotation between face-to-face and online instruction. In the enriched virtual model, students divide their time for a specific module between attending on-campus classes and remote learning. Online delivery of content and instruction was decided to be the most appropriate in the context of this study.

When moving from a traditional mode of delivery towards BL, as is the case at the NWU, educators should start to integrate technology in their classrooms. However, the mere integration of technology does not only require the educators to familiarise themselves with ICT, but they also need to acquire the necessary pedagogical expertise that is needed for effectively working in new, technology-based learning environments.

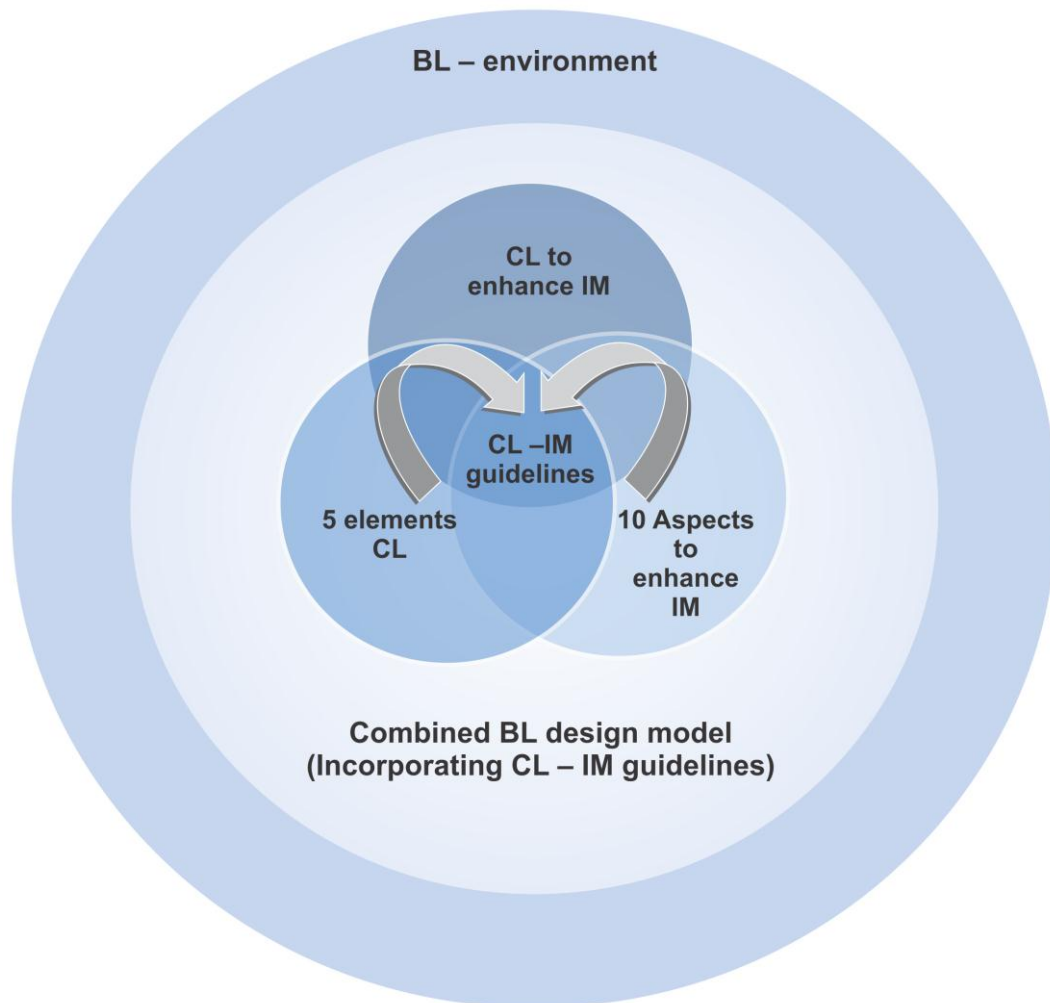
A number of BL design models were reviewed in this study, namely: 1) Mishra and Koehler's TPCK model (refer fig 3.4), 2) Picciano's multimodal conceptual model (refer Figure 3.5), 3) Puetendura's SAMR model (refer Figure 3.6) and 4) Bath and Bourke's BL design process (refer Figure 3.7). As all these models offer valuable tools and guides in the development of a BL course, this study combined all of these into a model that gives a holistic perspective on the design of a BL course. The TPCK model focuses on the fact that facilitators should have in-depth knowledge about pedagogy, subject content and technology. This model forms the very foundation of designing a BL course, and without all three key sources of knowledge – technology, pedagogy, and content – the facilitator will not be able to design good activities and make sure the module structure and overall educational processes are in place. Puetendura also focuses on the integration of technology and not explicitly on other aspects. His model indicates that the integration of technology should occur in phases as students get used to using it (refer Figure 3.6). Picciano's model focuses on a number of important aspects when designing a BL course (refer Figure 3.5). Most of the important components of his model are also included in Bath and Bourke's model. Bath and Bourke's model integrates the highest number of design components and it provides a more complete guide toward the design of a BL course (refer Figure 3.7). Although Bath and Bourke's (2010) model gives thorough insight into the design process, the other three models cannot be disregarded. Therefore, in an attempt to combine the most important aspects of each of the discussed models, a combined BL design model was designed that was used to plan the intervention for this study (refer Figure 3.8).

The combined BL design model consists of five phases, namely reviewing, planning, implementing, designing and improving. These five stages are the foundation of Bath and Bourke's model. Each of the phases consists of a few design components to focus on when designing or re-designing a course for a BL environment. These design components were identified in a synthesis of all four the discussed models (refer §3.4.5; Table 3.1). The TPCK model forms the centre of the combined BL model and guides the aspect of technology integration in the design of a BL model. Since Puetendura specifically focuses on the integration of technology, the four levels of technology integration was merged with the technological knowledge component of the TPCK model (refer §3.4.5). From this study the

combined BL design model were proposed and it is suggested to be used as a complete guide when designing a BL course.

### ***7.2.2.2 Implementing cooperative learning in a blended learning environment***

The combined BL design model does not focus on any specific teaching strategy, and therefore, in order to reach sub-aim two, the model needed to be customised specifically for a CL environment. As seen in Figure 7.2, to reach sub-aim two, ten aspects that enhances IM were firstly identified. Thereafter a list of guidelines on how to implement CL to enhance IM were identified taking the five elements of CL in account. The ten IM aspects as well as the five elements of CL were combined to develop the CL guidelines to be able to practically implement them in a classroom situation. However, since sub-aim two wanted to identify how CL strategies can be adopted for a BL environment, the combined BL design model was proposed. In §3.7, each of the design principles of the BL design model were discussed with reference to the CL-IM guidelines identified in Chapter 2. In this discussion, the ten aspects identified to enhance IM as well as the five basic elements of CL were integrated to create a framework that guides the facilitator to practically implement the combined BL design model in the classroom to enhance IM by means of CL. In Chapter 4 of the study, Table 4.2 – Table 4.6 were given as a summary of the analysis above, and these tables also features as a checklist or guideline when designing a CL-BL environment. The tables includes the design principle for each phase and specific guidelines on how to implement the design principle. Where possible an online or LMS tool that could be used to implement the specific design principle were proposed. The findings from sub-aim two were used to design the intervention which leads to sub-aim three.



**Figure 7.2 Cooperative learning in a blended learning environment**

**7.2.3 Conclusions for sub-aim three: to determine the influence of the adopted cooperative leaning strategies on intrinsic motivation in a blended learning environment.**

Before providing conclusions for sub-aim three, it is important to understand what the intervention for this study entailed. The ECON 121 module on which the research was conducted was previously presented in a traditional face-to-face environment and the use of eFund<sup>i</sup>™ and other online tools were limited to sending announcements and uploading PowerPoint slides. The facilitator that implemented the intervention with the researcher had to rethink the entire structure of the module, especially in terms of the integration of technology. To reach sub-aim three, to determine the influence of the adopted CL strategies on IM in a BL environment, the researcher did an empirical study to gather valid and reliable

data. A mixed methods inquiry approach was used to obtain reliable evidence (refer §5.2). There were four groups involved in the research process (refer §5.3): two groups from year one (control groups  $C_1$  &  $C_2$ ) and two groups from year two (control group  $C_3$  & experimental group  $E_1$ ).

As described in §6.5, the quantitative data indicated that the differences between the experimental group and the control groups regarding the IM factors were not large. In some cases a medium practical significant difference was recorded between the pre-test and the post-test, but the only factor that showed a large practical significant difference between the pre-test and the post-test was the relatedness factor of the experimental group. However, this factor did not indicate an increase towards the end of the module but rather showed a decrease. This could be due to the fact that the students did not like the fact that they were taken out of their comfort zone and were divided into random groups to take part in the team challenge. It might be possible that the students would have preferred working in groups with their friends rather than strangers. Nevertheless, as discussed in §6.5, the relatedness factor does not necessarily measure if the students worked well in their groups, but focuses on more personal aspects such as if they feel that by working in these groups future friendships were being established and if there was a feeling of trust. It could also be that the duration of the intervention did not provide enough time for these kind of relationships to be built. From the quantitative data, it might appear that there was no memorable changes in the students IM. However, there were a tendency that the students from the experimental groups measured a bit higher in most of the factors in the post tests (see 6.2.3).

When looking at the SDL scores of the groups, it was evident that only control group  $C_1$  measured a medium practically significance difference from the beginning to the end of the module and for the rest of the groups there was no statistically or practically significant difference between the data of the pre-tests and post-tests.

The qualitative data, on the other hand, gave some interesting insight into the quantitative data that pointed towards good IM and SDL skills. There was also proper indication that the CL intervention encouraged the students to work harder and helped them to foster SDL skills. The students indicated that they enjoyed working in groups, and they realised that they were not only responsible for their own learning but also of the learning of their team members. They understood that if they did their part, they will gain from it in the end, regardless of the fact that the team challenge did not count marks. They were motivated to contribute to the group success because they could see the bigger picture.

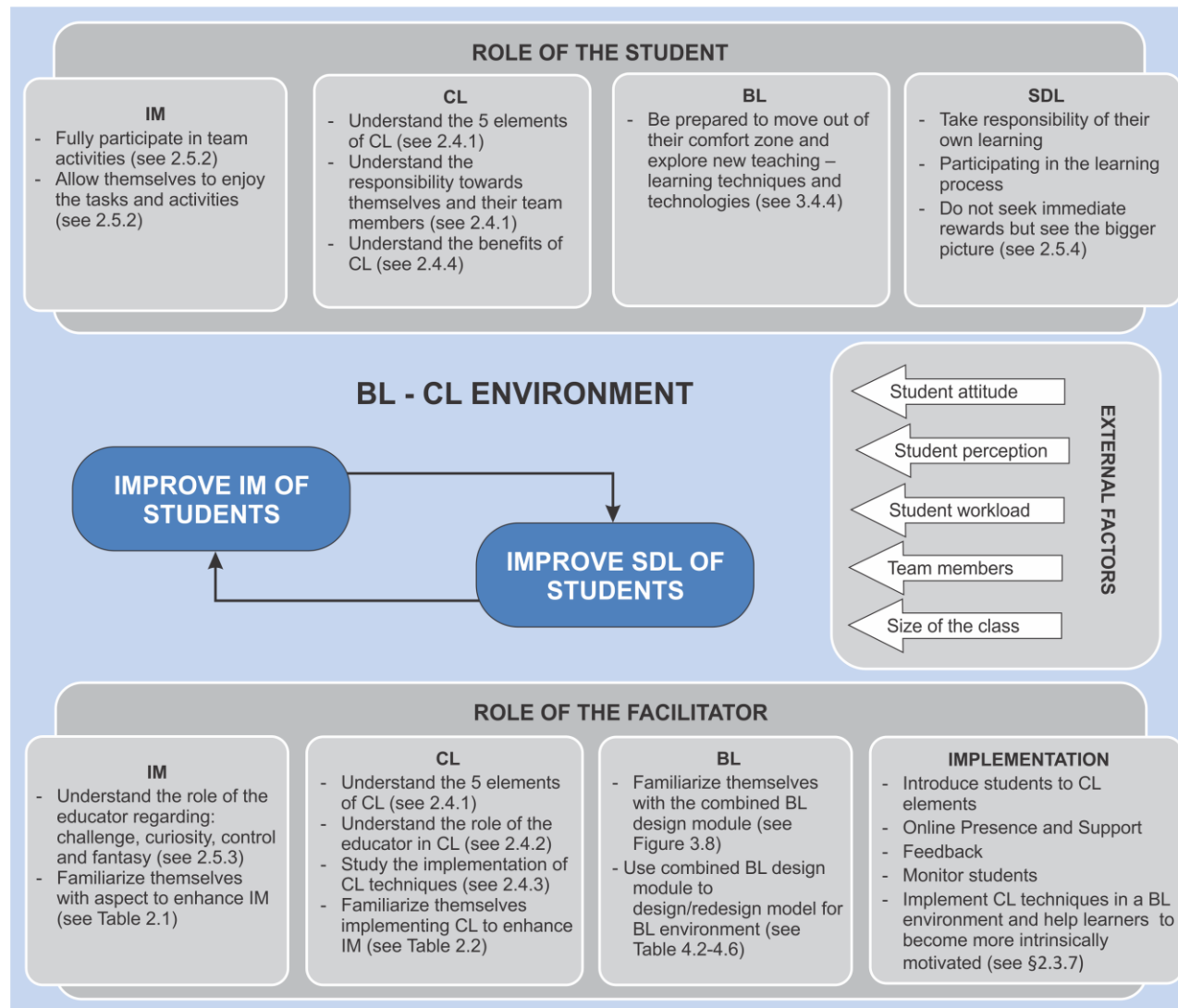
Although from the quantitative data it might seem that there were no memorable changes in the students' IM, there was a tendency that the students from the experimental groups measured a bit higher in most of the factors in the post-tests (refer §6.2.3). This together with the responses gathered from the qualitative research could be an indication that, even though it was small, the intervention might have influenced the IM of the students who participated.

As with the quantitative data from the IM questionnaires, the SDL skills of the students from the experimental group did not indicate a large practically significant difference between the pre-test and post-test, but there was a tendency of higher SDL skills at the end of the module. From the qualitative data, it was evident that CL intervention did foster some SDL skills in the students who participated in the intervention (refer §6.5). The students took responsibility for their own learning by taking part in an optional challenge that expected them to put in extra time and effort. They saw the value of this challenge and realised that they will benefit from it in the long run. They completed tasks even though it did not count marks towards their participation marks. The students were motivated to do their part, to learn more and to achieve good results.

There were certain limitations to the study and there are some aspects to reconsider in future research in order to get more meaningful results. These limitations and recommendations for further research are discussed in §7.4 and §7.5.

### **7.3 SYNOPSIS OF CONCLUSIONS REGARDING THE RESEARCH QUESTION FOR THIS STUDY: WHAT IS THE INFLUENCE OF COOPERATIVE LEARNING IN A BLENDED LEARNING ENVIRONMENT ON STUDENTS' INTRINSIC MOTIVATION?**

From the answers yielded for the three sub-aims of this study, the research question for this study can be answered. To answer this question and to make recommendations regarding the implementation of CL in a BL environment to improve IM, Figure 7.3 provides a synopsis of the implementation structure.



**Figure 7.3 Synopsis of the implementation structure**

Figure 7.3 shows how this study occurred in the context of a CL-BL environment. The aim of this study was to investigate how CL strategies can be adopted for a BL environment and the influence thereof on the students IM.

The figure firstly shows the role of the facilitator. It was evident from this study that the facilitator had four main focusses, namely CL, BL, IM and the implementation thereof. Regarding IM, facilitators should understand their role to assist students to become inherently more motivated. The literature focuses on four main IM factors that facilitators should focus on, namely challenge, curiosity, control and fantasy (refer §2.5.3). By understanding the extent of each of these factors and how to implement them in a classroom situation, facilitators can assist students in their journey to become more intrinsically motivated. A list of specific aspects to focus on when designing a module were compiled (Table 2.1) that could assist facilitators in this regard. Regarding CL, facilitators should make sure they know and understand the five basic elements of CL, familiarise themselves with CL techniques and understand the role of the facilitator when planning and implementing CL activities (refer §2.4). A list of specific aspects to focus on when designing CL-BL environment was compiled (Table 2.2) and could assist the facilitator in this regard. Regarding BL, the facilitator should use the combined BL design model when designing/redesigning the module. It is a holistic model that integrates all the important aspects regarding BL. Table 4.2-4.6 can be used as a checklist and guideline to assist the facilitator in this regard. Lastly, the facilitator should focus on the implementation (refer §2.3.7) of all the above-mentioned aspects. Students should be familiarised with new concepts, specifically regarding CL. Facilitators should spend as much time as possible supporting and monitoring the students, especially in the online environment, and continuously encourage them to participate in the activities and challenges that are specifically designed to enhance IM.

Figure 7.3 also shows the role of the student. Regarding IM, it was evident from the literature study that when the students fully participate in the activities and challenges, they will open themselves to the possibility to become intrinsically more motivated (Nam & Zeller, 2011; Wang, 2012). It was evident from the qualitative research that the students who fully participated in the team challenge were motivated to do well. They were prepared to do the work now and see the reward at a later stage. They understood that it is their own responsibility to excel and perform in the module, and they were willing to do whatever it takes. Regarding CL, it is important that students should try to understand the basic elements of CL because it might be an unfamiliar teaching-learning strategy for most of them (Johnson & Johnson, 2009; Heath, 2010). It is also important that they see the value of CL

and understand exactly what their responsibility is towards their group members and themselves (Kishore, 2012; Johnson & Johnson, 2012). The facilitator should take the time to support the students in this regard by having an information session and handing out information documents, as was done in this study (refer §4.5.1). When fully understanding the benefits of CL, students will be more open to engage in the new learning environment (refer §2.4). Regarding BL, students should be prepared to move out of their comfort zone, grasp the opportunity to broaden their horizons and adopt to the changes. It was evident from the qualitative research that the students who fully participated in the team challenge saw this new, unfamiliar teaching-learning environment as a challenge and allowed themselves to enjoy the activities and see the value thereof. Lastly, when students take responsibility for their own learning, participating in the learning process and grasping every opportunity to expand their knowledge and skills, their SDL skills are being developed (Ellis, 2007; Borich, 2007). Students need to see the end to the means and not focus on immediate rewards (refer §2.5.4). Although the quantitative data indicated that there were no notable changes in the SDL of the students, the students that participated in the team challenge chose to take part in it regardless of whether it counted towards their final marks or not. They managed to see that by taking part in the challenge, they will benefit from it in the long run and it will expose them to opportunities that assist them to explore their knowledge and skills. Although these students might not yet be at the end of the SDL spectrum, it is definitely a move in the right direction.

Except for the role of the student and the role of the facilitator, Figure 7.3 indicates that there are some external factors that also have an influence on the success of the implementation process that was identified from the literature study and specifically the qualitative research. The first factor is the attitude of the student. If students are willing to participate and do their part, they open themselves for the opportunity to become more self-directed and improve their IM (Nam & Zeller, 2011; Wang, 2012). It was evident from the qualitative research that the students who decided that they wanted to participate in the team challenge saw the value of the challenge and felt that they benefitted in the end. Some of the students mentioned that their fellow team members did not like the fact that they would not receive marks for all the activities and decided not to put in a lot of effort.

The second external factor is the students' perception of, for example, the difficulty of the module, which seems to have influenced their IM (Shunck et al., 2012). From the qualitative research it was evident that the students had pre-constructed perceptions about modules based on other students' experiences or their own experiences in the field of study in the past. Some of the students mentioned that they did not expect that the module would consist

of “that much calculations and sums” while others said that they knew it was going to be a difficult module since they did not have economics as a school subject. However, most of the students mentioned that they had economics at school and they liked it, and therefore they could not foresee any problems. The mind sets with which they approach the module are influenced by these perceptions and might determine if they are motivated to work hard and succeed or not (Luis et al., 2011).

The third factor that has an influence in becoming more motivated is the student workload (Marsh, 2012; McGee & Reis, 2012). This workload does not only refer to the specific module but to the overall workload of the students. The students that participated in the qualitative research mentioned that they sometimes struggle with time management and dealing with everything that is expected of them. Some of them said that when they were confronted with a choice between doing something for marks or not, they would choose the assignment that counts for marks if they run out of time.

Fourthly, when implementing a CL environment, some students might not be comfortable with the group they were assigned to. The relationship with and attitudes of their fellow team members also has an immense influence on their own IM (Bagheri & Gasevic 2011; Yi & Luxi, 2012). Some of the students that participated in the qualitative research mentioned that it made them a bit negative when all the team members did not want to do their part. A few of them also mentioned that they would have preferred working with people they know, because they know what to expect from them.

The last factor pertains more to the facilitator than the students. Although large class sizes can also influence the participation of the students, it ultimately complicates the work of the facilitator to attend to all of the students. According to Baran and Correia (2009), instructors may not be able to fulfil all the facilitation responsibilities because of the high time commitment required. When the group of students is too big, the facilitator will struggle to support and monitor student activities efficiently. They suggest that facilitation should be a shared responsibility among instructors and students. Changing the traditional role of the instructor from having total control of the teaching environment to sharing the control with the student emphasises the students’ role as autonomous, independent, self-motivated managers of their own time and learning process (Baran and Correia, 2009).

It is also visible from Figure 7.3 that in a CL-BL environment, IM and SDL are in a constant process of influencing one another. Students who are motivated take responsibility of their own learning. Students who are self-directed see the potential for increased learning because of an increased responsibility for participating in the learning process, a greater

feeling of ownership of the learning process and expanded ability to use a variety of techniques to achieve learning goals (refer §2.5.4).

#### **7.4 CONTRUBUTION OF THIS STUDY**

In this study the researcher identified ten aspect to keep in mind that could improve students' IM. These ten aspects and the five basic elements of CL were combined to create a set of guidelines on how to implement CL to enhance IM. Although CL is well researched in a face-to-face environment, not much research on the implementation thereof in a BL environment could be found. Therefore, from the synthesis of BL literature, the researcher proposed the combined BL design model. This model integrates a number of BL design principles, IM aspects and CL elements into one model. The role of the facilitator and the role of the learner in the implementation of CL-BL environment to improve IM are discussed and could therefore be used as a complete guide when designing or redesigning a CL-BL module.

#### **7.5 LIMITATIONS OF THIS STUDY**

The following limitations were identified after the literature study, empirical research and results of the study were taken into consideration:

The facilitator struggled to guide and support all the students in the online component without additional assistance. When working with large groups such as the ECON 121 group, the support factor should be planned extensively. The facilitator should either consider alternative methods of support such as the peer-support suggested by Baran and Correia (2009) or by appointing more facilitators. Since funding for the appointment of facilitators might be a problem, it is necessary to also investigate other options.

Since the tendency of the results from the experimental group and the control groups were the same, it might be that the students' IM was not necessarily only determined by the intervention but also by external factors as indicated in Figure 7.1.

Another limitation that was observed in the study was the fact that the duration of the intervention was relatively short. Factors such as a person's SDL and IM take time to change, and students might need a longer period of time to gradually adapt to the changes made in the teaching-learning environment. Grow (1991) presents a model that shows the different stages of SDL. From his model, it is evident that it takes time for a student to move from a passive and dependent learner (stage one) to a self-directed and initiated learner (stage four). According to Grow (1991), this process may take years and the facilitator should

coach, guide and facilitate students throughout this process. In a semester course, the time spent on examinations and recesses means that students only spend about 18 weeks on academic work. A semester course might therefore not give sufficient time to accurately measure the changes with a quantitative research instrument, but the progress of the students might be visible when carefully selecting the interview questions when conducting qualitative research.

The researcher was dependent on the enthusiasm and skills of Lecturer A conducting the module. Although the researcher tried to encourage the lecturer and helped with the design of the tasks, the lecturer remained the responsible person to implement the intervention. Therefore, it might be possible that some parts of the intervention was not implemented exactly as the researcher intended it.

Lastly, the fact that the quantitative component of the study did not measure notable changes even though the qualitative components indicated that the intervention definitely influenced the students' IM and SDL skills positively is of concern. Other studies on SDL such as Tredoux (2012) and Bailey (2016) found the same tendency, and the question is therefore raised if changes over a short timeframe can accurately be measured for concepts such as IM, CL and SDL by making use of quantitative measuring instruments. More research should be done in this regard.

## **7.6 RECOMMENDATIONS FOR FURTHER RESEARCH**

It would be beneficial to conduct a longitudinal study be conducted where the BL-CL approach is implemented by more facilitators over a longer period of time as part of the students' academic programme. If the students are confronted with this teaching-learning approach in more contexts, they might adopt to it quicker and the results might be more visible.

Since the group that participated in the team challenge was quite large and the facilitator struggled to fully support the students in the online environment, it is recommended that the same study be conducted with a smaller group of students. By doing this, the findings may give an indication of how much the facilitator support factor influences the students' IM.

The same study can also be conducted with the researcher being solely responsible for the students and therefore being able to implement all the design principles as it is intended to be. It is also recommended that the study be expanded to other subject areas.

Further research should be done to critically evaluate the quantitative questionnaire in terms of what the students want others to believe about them and how it differs from their honest answers. The data in this research study was self-reported. Baran and Correia (2009) had the same concern and suggested that future studies are needed to provide additional support for the validation of the IM inventory (IMI) dimensions through correlations with other assessments of motivation indicators. This may include behavioural indices or observations of others who can corroborate the reports made independently by students.

## **7.7 SUMMARY**

In this study, promoting SDL through the implementation of CL in a higher education BL environment was researched. The study consists of seven chapters. Chapter 1 was the introduction and problem statement. In this chapter the motivation for the study was explained and the aim and sub-aims of the study were determined. Chapter 2 was the first of the literature chapters and dealt with the theory behind IM and CL, including how CL could be implemented to enhance IM. In Chapter 3 a literature study on BL was done and a new BL design model was proposed. The purpose of this model was to design a BL course with the integration of CL. Chapter 4 focused on the implementation of the team challenge in the ECON 121 module as the intervention, while chapter 5 and 6 focused on the empirical research. In chapter 5 the research design and methodology, viewed from a constructivist perspective, were discussed. A mixed-method research approach was used and both the quantitative and qualitative methods were outlined. In Chapter 6 the results for the quantitative and qualitative research were given and the relationship between these two methods was explained. In the final chapter the conclusions pertaining to each of the sub-aims and the overall aim were given.

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## ADDENDUM A

# IMPLEMENTATION GUIDE: COOPERATIVE LEARNING IN A BLENDED LEARNING ENVIRONMENT (COMPILED BY C BOSCH)

## 1. Basic elements of CL

According to Johnson and Johnson (1994), the five basic elements necessary for a lesson to be cooperative are: (1) positive interdependence, (2) individual accountability, (3) face-to-face promotive interaction, (4) social skills and (5) group processing. Research has shown that when these elements are properly implemented, group collaboration in the classroom can increase learning and achievement, social skills, self-esteem and attitudes toward classmates and school (Heath, 2010). Johnson et al. (2013) believe that understanding how to implement the five basic essential elements of CL enables facilitators to structure their lessons and adapt CL to their specific circumstances, needs and students.

### *1.1 Positive interdependence*

Positive interdependence exist when students feel that they are linked to their fellow group members and that they will not succeed if they don't coordinate their efforts with those of the group to complete a task successfully (Kishore, 2012). Students have to realise and believe that they should "sink or swim" together and to achieve the expected outcome, they have two main responsibilities, namely: 1) reach the assigned goal 2) ensure that all members of the group reached the assigned goal (Johnson & Johnson, 2012). When these two responsibilities are understood, students realise that each group member's efforts are required and indispensable for group success and that each group member has a unique contribution to make because of his or her resources and/or role and task responsibilities (Johnson & Johnson, 2012). Johnson and Johnson (2012) further distinguish different types of positive interdependence. The following four, namely 1) positive goal interdependence, 2) positive reward interdependence, 3) positive resource interdependence and 4) positive role interdependence are relevant to this study. Each of these aspects will be discussed shortly in the following sections.

### ***Positive goal interdependence***

Individuals achieve more with positive goal interdependence than when they work individualistically (Johnson & Johnson, 2009) because students realise that they can achieve their learning goals only when all the members of their group also achieve their goals (Johnson & Johnson, 2012). The facilitator has to structure a clear mutual goal for the group to ensure that students care about how much each group member learns and contributes (Johnson & Johnson, 2012).

### ***Positive reward interdependence***

Rewards are a distinguishing factor between strong and weak forms of interdependence (Brewer & Klein, 2006). According to Johnson and Johnson (1989), reward interdependence largely explains the relationship between cooperation and achievement. They believe that individuals will increase their achievement only if there is a specific group goal reinforcing them to do so. To establish positive reward interdependence, a mutual reward should be given for successful group work and members' efforts to achieve it (Johnson & Johnson, 2012). They believe that each group member should receive the same reward when the group achieves its goals but facilitators may wish to add joint rewards (e.g. if all members of the group score above a certain percentage on the test, each receives some bonus points). Johnson & Johnson (2012) advice facilitators to give students 1) an overall group grade for their mutual task, 2) an individual grade they receive for a test and 3) bonus points if all members of the group attain above a certain percentage on the test. The appropriate rewards have a positive impact on performance, attitude, and group processes (Brewer & Klein, 2006).

### ***Positive resource interdependence***

For this aspect of positive interdependence, each group member only has access to a specific portion of the resources that is necessary for the task to be completed (Johnson & Johnson, 2012). Thus the members' resources have to be combined for the group to achieve its goals. The jigsaw method is a good example of this aspect and will be discussed in §2.4.3 as part of CL techniques.

### ***Positive role interdependence***

Each member is assigned complementary and interconnected roles that specify responsibilities that the group needs in order to complete the joint task. Facilitators create role interdependence among students when they assign them complementary roles such as reader, recorder, checker of understanding, encourager of participation and elaborator of knowledge. Such roles are vital to high-quality learning.

The role of checker, for example, focuses on periodically asking each group mate to explain what is being learned. Rosenshine and Stevens (1986) reviewed a large body of well-controlled research on teaching effectiveness at the pre-collegiate level and found "checking for comprehension" to be one specific teaching behaviour that was significantly associated with higher levels of student learning and achievement. Although the facilitator cannot continually check the understanding of every student, the facilitator can engineer such checking by having students work in cooperative groups and assigning one member the role of checker.

### ***1.2 Individual accountability***

Individual accountability shows students their personal responsibility for the group's goal (Johnson & Johnson, 2009). It involves two components: (1) each student is responsible for his or her own learning and (2) each student is responsible for helping the other group members learn (Abrami, Bernard, Bures, Borokhovski & Tamim, 2011). As an individual, each student is accountable for and will be individually assessed for a specific task or section of the work (Tsay & Brady, 2010). However, as a member of the group, they must help to coordinate the whole operation and ensure that the group task is completed (Yi & Luxi, 2012).

According to Onwuegbuzie, Collins and Jiao (2009), individual accountability is the key to the success of the overall group and helps to prevent reduced individual effort resulting from too much dependence on other group members. Like positive interdependence, individual accountability develops along a continuum from a facilitator-centred structure to a point where students assume responsibility for their own learning (Abrami et al., 2011). Wang (2012) states that to obtain individual accountability facilitators should establish and maintain student responsibility for appropriate behaviour, engagement and outcomes by the way they structure and facilitate tasks. Individual accountability allows the facilitator to determine if

students are actually involved in the learning process, or if they are simply riding on the work of others (Heath, 2010). It is the key to ensuring that all group members become stronger and better prepared to complete assignments independently (Heath, 2010).

### ***1.3 Promotive interaction***

Although some of the responsibilities in CL may be done on an individual basis, most of the tasks are performed through an interactive process in which each group member provides feedback, challenges one another, and teaches and encourages his or her group mates (Tsay & Brady, 2010). Promotive interaction occurs when students' facilitate each other's efforts to succeed in the group's goal through supportive interaction (Johnson & Johnson, 2009). As the promotive interaction increases, so does peer accountability, and students begin to feel responsible for the success of each other (Johnson & Johnson, 2009). They noted that during face-to-face promotive interaction there is less stress on the group members, they behave in a trustworthy way towards each other, and higher quality decision making is apparent. Group members exchange and challenge each other's ideas and provide positive feedback (Heath, 2010). According to Johnson and Johnson (2009), positive interaction is characterised by group members who:

- act in trustworthy ways and create an environment with low anxiety and stress;
- provide efficient help and feedback to group mates in order to improve subsequent performance;
- share and exchange resources;
- are motivated to strive for mutual benefit;
- encourage each other to achieve mutual goals;
- challenge each other's reasoning and conclusions to promote higher order thinking skills;

- take the perspectives of other group members into consideration and explore different points of view as possibilities.

Positive interaction results in interpersonal processes such as modelling appropriate use of social skills, supporting and encouraging efforts to learn, and participating in joint celebrations of success (Johnson et al., 2013).

#### ***1.4 Appropriate use of social skills***

Effective cooperation is not only based on the completion of a task but also on the teamwork and interaction between group members (Johnson & Johnson, 2009). Students, therefore, must be taught the social skills needed for high-quality cooperation and be motivated to use these skills (Johnson & Johnson, 2009). For CL to be successful, students need to have interpersonal and small group skills, where individuals trust each other, make decisions, resolve conflicts and communicate effectively (Johnson, Johnson & Smith, 2013). Facilitators should develop and encourage social skills through the tasks given to students. These skills includes listening, individual and shared decision making, taking responsibility, learning to give and receive feedback, and learning to encourage each other (Wang, 2012). The development of social skills is essential when students work with classmates who have different learning skills, cultural backgrounds, attitudes and personalities (Baghheghi, Koohestani & Rezaei, 2011). Baghheghi et al. (2011) believe that working in heterogeneous groups promote student learning, and these differences force students to interact with group members that feel and think differently than themselves. Through this interaction they get to know and learn to trust each other, communicate accurately, accept and support each other, and resolve conflicts constructively (Yi & Luxi, 2012).

#### ***1.5 Group processing***

Group processing refers to the reflection on the contributions of group members on activities to assess who performed well and which actions should be continued or discontinued (Johnson & Johnson, 2009). Through this reflection students get feedback that they can consider and use to modify an activity to achieve their goal (Yi & Luxi, 2012). According to Nam & Zeller (2011), group processing has the potential to clarify and

improve the members' effectiveness in achieving the group's goals. Johnson et al. (2013) state that group processing may result in reducing the complexity of the learning process, eliminating unnecessary and incorrect actions, improving team work skills and celebrating their success.

## **2. CL techniques**

Several methods of CL have been developed over the last century. Each method has its own unique attributes for enhancing student learning. Some of the more well-known practiced and researched methods will be discussed briefly in the following sections.

### **Think-Pair-Share (Schul, 2011)**

- Think-Pair-Share is a collaborative learning technique that allows students to engage in individual and small-group thinking before they are asked to answer questions in front of the whole class.
- There are three steps to this method.
  - The first step is to provide each individual student something to think about.
  - Secondly, individual students are given time to think and then write down their responses.
  - Thirdly, pairs of students share, with their classmates, what they learned on their own. During this stage a few students can be called on by the teacher to share their thoughts and ideas with the whole class.
- The Think-Pair-Share technique also enhances the student's oral communication skills as they have ample time to discuss their ideas with the one another and therefore, the responses received are often more intellectually concise since students have had a chance to reflect on their ideas.

### **Student teams-achievement divisions (Duckworth, 2010; Wang, 2012).**

- This collaborative learning technique focuses on equal opportunities for success and allows students of all ability levels the opportunity to succeed.

- STAD includes small heterogeneous group and consists of five major components: class presentations, teams, quizzes, individual improvement scores, and team recognition.
  - The educator first presents material by means of e.g. direct instruction or discussion
  - Small heterogeneous teams selected according to academic performance meet to study worksheets, discuss problems together, compare answers, and correct misconceptions
  - To ensure that every student is responsible for knowing the material they take individual quizzes and are not allowed to help each other
  - Students individual quiz scores are compared to their past average and they earn points for their teams based on how much their scores could exceed their previous quizzes
  - The teams effort can be recognized if students' average scores exceed a certain criterion by giving extra rewards
- Although in this method the group score is determined through summation of individual group member scores, students are competing against themselves rather than other students

**Jigsaw (Doymus et al., 2007Schul, 2011).**

- Jigsaw refers to the ability to put all the individual puzzle pieces together in order to see the entire picture
- The basic components of the jigsaw consist of the following steps:
  - Each student is assigned to heterogeneous home groups and the information and academic material is handed to the group
  - Each student is given a specific part or subtopic of the information on which they should become the expert
  - The experts familiarize themselves with the information and then form new groups consisting of the individuals from the other groups who were granted the same academic material in these new groups they discuss and study the information before they return back to their home group to teach the section to their home group members.
  - Each student undergoes individual assessment on all subtopics.

- The cooperative goal is that all students know all parts of the educational material, where all of the students must teach and learn (Azlina, 2010).

**Group investigation (Bawn, 2007; Dickinson, 2014; Schul, 2011):**

- Group investigation consists of four components:
  1. **Investigation** refers to the orientation to inquiry, preparing the students to continue through this cooperative process;
  2. **Interaction** accounts for the social aspect of the model where students come together and discuss investigations;
  3. **Interpretation** occurs both on the individual level and the group level as students seek to make sense of their investigations and observations and
  4. The goal, throughout this process, is to develop **IM** for students to want to find information and understand the concepts under investigation.
- Group investigation can be implemented by following these main steps:
  - The students identify topics and are placed in teams to conduct an investigation;
  - The team members decide on subtopics, goals, and how topics are to be studied;
  - They review, analyse, and draw conclusions from information they have gathered;
  - Each student has individual responsibilities and the group works together to prepare a final report;
  - Group members take turn to present it in front of the class by using role plays, panels, simulations, or other methods; and
  - The teacher and other groups evaluate the report (Bawn, 2007; Dickinson, 2014; Schul, 2011).

**3. Bloom's revised taxonomy**

Bloom's taxonomy has been revised to suit a BL environment (Churches, 2008). This revision includes suggestions for tasks that can be used to support particular objectives (Table 3.3). Bath and Bourke (2010) states that before deciding on a particular tool/application, it is important to first define your purpose for the activity. Churches (2008) suggest a number of BL activities to choose from in each of Bloom's levels. An example of how activities from each of Bloom's levels can be implemented in a CL environment will be discussed below:

- **Remembering** (Recognising, listing, describing, identifying, retrieving, Naming, locating)

Each student can be asked to master specific section of the work and write an online test or quiz on it. Only when all the students in a CL group have completed their tests, the students will be able to access the rest of the content or get the group task. The group task can be executed in a form of a jigsaw so that the students can learn from each other. This will address positive resource independence and individual accountability because the student are not only responsible for mastering the work for his own benefit but the group is depending on his contribution as well.

- **Understanding** (Interpreting, summarising, paraphrasing, classifying, explaining, comparing)

Students can be expected to find information on a specific topic and, in a group, master the information in order to present it to the other groups. Each group member should be assigned to a specific role and know what are expected of them. The information that they found should be structured and presented in such a way that the other groups will be able to master the presented content from the medium made available online by the responsible group. This will establish positive reward- and positive role interdependence. The students will then receive a group mark for the final product. The facilitator can decide if the students should grade each other for their contribution as part of the final mark.

- **Applying**(Implementing, carrying out, using, executing, editing)

Each group can be given a real life problem to solve. The group than have participate in an online discussion forum to give ideas on how to solve the problem. Each student will then be graded on the relevance and intellectual level of their contributions to the forum. It should be evident in their posts that they mastered the theoretical aspects of the work and know how to apply it to a real life situation. This activity can also be used to guide and train their higher order thinking skills (e.g. reasoning), which will benefit them later in the module when writing exam. Even in an online environment promotive interaction and the appropriate use of social skills can be established when students facilitates each other's efforts to succeed in the group's goal.

- **Analysing** (Comparing, organising, deconstructing, interrogating, structuring)  
A video of a specific situation or real life problem can be given to each group. The group have to review and analyse the video by means of specific criteria. The criteria will be listed as headings in a wiki page and the group members need to contribute to and modify the wiki page in order to generate one document that will be handed in for a group mark. The group should also reflect on the contribution of each group members and how they handled the assignment. This will result in group processing and their reflections can influence the way in which similar activities will be handled in future
- **Evaluating** (Checking, hypothesising, critiquing, experimenting, judging, testing)  
Based on a scenario, students can be asked to research for example the best teaching strategy to facilitate a specific topic. They should present the details about the teaching strategy and how it works in a in a collaborative wiki page. The group members then have to create a report on why they made certain choices and why the specific strategy is the best one. Throughout the activity students should communicate in a discussion forum to distribute the work and make decisions regarding the assignment.
- **Creating** (Designing, constructing, planning, producing, inventing)  
As a follow on, on the above mentioned assignment, group members can now be expected to stage a classroom situation and conduct a role play on how the teaching strategy should be carried out. This can be filmed and uploaded in the LMS so that the other groups can comment and evaluate their interpretation of the teaching strategy.

#### 4. Guidelines for enhancing intrinsic motivation

Number	Guideline
1	Create activities that challenge students' skills
2	Encourage students to set personally meaningful goals
3	Give rapid and thorough feedback
4	Encourage reflection
5	Create opportunities that makes a person interested to find out more about something
6	Make content relevant to real-world experiences
7	Consider your students interests, background knowledge, and abilities when designing tasks
8	Allow students to make certain choices and take control of the learning situation
9	Help learners to imagine using the learned information in real-life settings.
10	Make learning fun



## IMPLEMENTATION OF THE BLENDED DESIGN MODEL

Planning			
Aims and objectives	Design principle	Implementation guideline	Proposed online or LMS tool
	Alignment	To ensure that these three components of your course are aligned, ask yourself the following questions: <b>Learning objectives:</b> What do I want students to know when they leave this course? <b>Assessments:</b> What kind of tasks will reveal whether students have achieved the learning objectives I have identified? Instructional strategies: What kind of activities in and out of class will reinforce my learning objectives and prepare students for assessments?	Not applicable
	Communicate module information	Communicate the module aims, goals, outcomes and assessment criteria with students. Assessment criteria for each task can be made available in the form of an announcement that goes out from the LMS or as part of the assignment so that students can be sure of exactly what are expected from them when completing the assignment or task.	Wiki page Announcement tool Assignment tool
	Goal setting	Involve CL groups in setting goals or assessment criteria. A collaborative wiki page or a class discussion can be used to involve the students in planning and deciding upon learning aims and objectives.	Discussion forum Wiki page
	CL group admin	Communicate group sizes (3-4 per group) for CL tasks	
Discuss the different roles such as reader, recorder, checker of understanding, encourager of participation, and elaborator of knowledge. Make sure students alter between these roles in the different CL tasks.			Announcement tool Discussion forum Wiki page
Communicate the importance of working together to the groups. The students should understand the importance of working together with regards to the five elements of CL (individual accountability, positive interdependence, social skills, group processing and promotive interaction).			Announcement tool Class discussion Discussion forum

PLANNING			
	Design principle	Implementation guideline	Proposed online or LMS tool
Content	Evaluate resources	Evaluate the academic quality of resources. Make sure all the online tools and resources are valid and reliable.	Not applicable
		Decide if resources are adequate for a BL and CL environment.	Google Scholar Resources folder Library website
	Availability of resources	Decide which resources should be made available and which resources students should find on their own.	Resources folder eGuide tool
		Identify multiple technologies or media to support a specific goal.	
		Where possible, substitute non-electronic resources with online resources.	
	Teaching strategies	CL strategies	Decide on the most appropriate CL teaching strategies. See Addendum A for CL strategies (Jigsaw, Think-pair-share, STAD, Group investigation).
Seek ways to modify and adopt the face-to-face strategies for a BL environment. Instead of giving time in class for discussions, set up a discussion forum or a wiki.			
Course management	Structure of activities	Structure and organise both face-to-face and online activities carefully through clear and specific instructions.	Assignment tool Announcement tool
	Student participation	Monitor student progress and participation by using the LMS. The facilitator can use the statistics tool to see which students do not visit the learning platform regular or participate in group discussions.	Wiki Discussion forum Statistics tool Grade book
	Class rules	Engage the CL groups to develop a set of rules for F2F and online activities	Discussion forum Class discussion Wiki

PLANNING			
	Design principle	Implementation guideline	Proposed online or LMS tool
Student feedback	Feedback on teaching strategies	Use group and student feedback to improve teaching strategies and activities	Survey Monkey Fluid survey Online diary Wiki
	Feedback on tasks	Enable students to: <ul style="list-style-type: none"> <li>• reflect on and evaluate tasks</li> <li>• compare and challenge each other's work</li> <li>• provide feedback to each other</li> </ul>	Discussion forum survey
Student profile	Prior BL and CL experience	Establish the student's prior BL and CL experience	Discussion forum Survey Monkey Fluid survey Class discussion
	Accessibility	Find out if the specific technologies that you want them to use are accessible	Not applicable
	Skill level	Find out what their skill level and attitude is to use technology	Skills Test Discussion forum Survey Monk

Design		
Design principle	Implementation guideline	Proposed online or LMS tool
Constructive alignment	Pedagogical objectives	Pedagogical objectives of a course should drive the learning outcomes and teaching-learning activities.
		Assessment tasks need to be aligned and correspond with each other.
Assessment	Assessment outcomes	Students should know exactly what is expected of them.
	Assessment strategy	When CL tasks are assessed, students can in some cases be assessed individually for a specific task or section of the work.
		Students can also be assessed on how well they functioned in the group.
		Most CL techniques suggest a form of assessment that compliments the specific technique (Jigsaw, Think-pair-share, STAD, Group investigation). See implementation guide (Addendum A).
		Rapid, comprehensive feedback should be given after each assessment task.
	Technology integration	Make sure students know how to use the technologies used in the assessment task.
	Technical support	Make sure students know where to go for technical support and assistance.
	Submission of assessment	Make sure students know how the assessment task should be submitted.
Assessment criteria	Make sure students know how their work will be assessed. Provide a clear set of criteria and standards or a rubric.	

Design (continued)			
Design principle	Implementation guideline	Proposed online or LMS tool	
Activities	Administrative aspects	<p>When designing CL tasks and activities, the facilitator should keep specific administrative aspects in mind, e.g.:</p> <ul style="list-style-type: none"> <li>• size and structure of the group</li> <li>• allocated time</li> <li>• layout of learning space</li> <li>• roles of group members</li> <li>• accessibility and distribution of relevant resources</li> </ul> <p>Define the purpose for the activity before deciding on a particular tool/application.</p>	Not applicable
	Mode of activity	<p>Decide if the task will be conducted in the face-to-face classroom, in the online environment or within a combination of the two.</p> <p>Student activity beyond the classroom should ideally involve a combination of both individual and collaborative activities, as well as both formal and supplementary activity and resources to support students in their learning and achievement of the course objectives.</p>	Not applicable
	Types of questions	<p>Use Bloom's revised taxonomy when designing learning tasks.</p> <p>See implementation guide (Addendum A).</p>	Not applicable
Workload	Student workload	<p>When designing a BL module, the workload should not exceed that of a traditional face-to-face course.</p> <p>Consider spending <i>less</i> time in class during contact sessions to allow students to spend more time in the online environment.</p>	Not applicable
Time spent	Time management	<p>Keep the time and effort for designing learning tasks and for students to complete tasks in proportion to their impact or importance in the course.</p>	Not applicable

Implementing (continued)			
Design principle		Implementation guideline	Proposed online or LMS tool
Course Orientation	Rationale	<p>Explain the rationale for the different approach to the module.            Help students to understand what blending learning is and why they would be required to sometimes work in collaborative groups.</p>	Class discussion
	Skills development	<p>Familiarise the students with process skills needed to complete specific tasks such as:</p> <ul style="list-style-type: none"> <li>• reflection writing</li> <li>• conflict management</li> <li>• goal setting</li> <li>• social skills</li> </ul> <p>Responsibilities of different role players should be built into assignments.</p>	<p>Online tutorials            Assignments</p>
Presence	Facilitators presence	Act as a mediator in CL activities.	<p>Discussion forum            Wiki            Chat room            File sharing</p>
		<p>Provide regular feedback by including the following:</p> <ul style="list-style-type: none"> <li>• Interrupt discussions to introduce new ideas.</li> <li>• Enable students to post urgent questions and seek help from fellow students or the facilitator between contact classes.</li> </ul>	
		Be visible and facilitate the task, whether the tasks take place in the online environment or face to face.	
		Facilitate discourse that stimulates student engagement and interaction in scheduled activities to make sure that groups are functioning properly and stay on course.	

Reviewing			
Design principle	Implementation guideline	Proposed online or LMS tool	
Reflection	Student reflection	<p>Students need to:</p> <ul style="list-style-type: none"> <li>• reflect on what they have learned</li> <li>• reflect and evaluate the task</li> <li>• share their reflections with their facilitators and fellow students challenge each other's work and provide positive feedback</li> </ul> <p>Feedback from students can be obtained by asking informal questions after an activity or students can fill in an online questionnaire at the end of the module.</p> <p>A discussion forum or wiki can be used to reflect, either as group exercises or for individual journaling activities.</p> <p>Group reflection allows students to compare their work with the other students and think about the differences and similarities between them. Students facilitate each other's efforts to succeed through promotive interaction.</p>	Discussion forum Wiki
	Self-reflection	Facilitators should reflect on their own teaching strategies in reviewing what worked and what did not work in a class.	Keep an electronic journal
	Peer reflection	Facilitators could ask colleagues in the faculty to evaluate the resources, study material and class activities.	

Improving			
	Guideline	Implementation	Proposed online or LMS tool
Improving	Improving learning environment	Take the self, student and peer evaluation in consideration to improve on the aspects that didn't contribute to a better learning environment.	Not applicable

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## ADDENDUM B

# ONLINE TEAM ACTIVITIES

## Online Team Activity 1

This is a *meet-and-greet* activity to make sure all team members are on board. We also want to make sure that you are comfortable with the technologies that we might use throughout the semester BEFORE we start with the real IMPORTANT stuff.

### DUE FINAL DUE DATE FOR THIS ACTIVITY IS

WEDNESDAY 5 August 2015

For this activity – as for the ones to follow – each group member will have a specific job to do. Make sure you understand exactly what are expected of you – the success of your team members are in your hands.

We do have a TEMP system in place, just for incase a team member responsible for a specific part is abducted by aliens and cannot for fill his part:

- **The temp for the CEO is the PR MANAGER**
- **The temp for the PR MANAGER is the SECRETARY**
- **The temp for the SECRETARY is the ANALYST**
- **The temp for the ANALYST is the CEO**

#### Activity 1.1 (ALL TEAM MEMBERS)

As soon as you read this post, send a message in the message tool in eFund (Instructions in eGuide) to the rest of your group members to confirm that you are on board and ready to partake in the activity. Name the message **Activity 1.1** and provide the following details in the message: **Name, Surname, Student number, Cell number and Email address**. This information will be needed by the **Analyst** to complete his part of the activity. **REMEMBER:** Your team depends on you...don't let them down!!!

#### Activity 1.2 (CEO)

If a team member **has not responded** to this announcement by **WEDNESDAY 29 JULY 17:00** the **CEO** should check up on the team members.

#### Activity 1.3 (SECRETARY)

The secretary will create the following discussion threads (Instructions in eGuide) to make the discussions easier to follow:

1. CEO vs. Secretary
2. CEO vs. PR Manager
3. CEO vs. Analyst
4. Secretary vs. PR Manager
5. Secretary vs. Analyst
6. PR Manager vs. Analyst

#### Activity 1.4 (ALL TEAM MEMBERS – GROUP ACTIVITY)

In the Forum tool on eFundI you will find a discussion forum named **Activity 1**. The topic for this forum is **Meet-and-Greet**

For the **GROUP ACTIVITY** and everyone should participate in the discussion forum:

All team members should partake in the following discussion:

**Six degrees of separation** is the theory that everyone and everything is six or fewer steps away, by way of introduction, from any other person in the world, so that a chain of "a friend of a friend" statements can be made to connect any two people in a **maximum of six steps**. **Found out if you and your team members can be linked in less than 6 steps**. Use the discussion threads created by the secretary to **chat with each of your team members to find your connection**.

#### Activity 1.5 (ALL TEAM MEMBERS – INDIVIDUAL ACTIVITY)

After you found your connections, each team member should complete **Activity 1.5** in the **eGuide** on their own. Post another message in the message tool to confirm that you have completed **Activity 1.5**.

#### Activity 1.6 (ANALYST)

A **Google form (Activity 1.6 in eGuide)** should be completed at the end of the activity to confirm all members are now on board and that you are ready for the team challenge this semester.

### Self-evaluation checklist – did I do my part?

CEO		<input checked="" type="checkbox"/>
Activity 1.1	Send a <b>message</b> in the <b>message tool</b> with the following details: <b>Name, Surname, Student number, Cell number and Email address</b> .	
Activity 1.2	Check up on the team members in the <b>messages tool</b> and <b>make sure they are ready to partake in the activity</b> .	
	If a team member has not responded to this announcement by <b>WEDNESDAY 29 JULY 17:00</b> you should track them down get them on board.	
Activity 1.4	Participate in the discussion forum:	
Activity 1.5	Complete <b>Activity 1.5</b> in the <b>eGuide</b>	
TEMP	<b>Stand in for the ANALYST if he/she does not pitch</b>	

<b>PR MANAGER</b>		<input checked="" type="checkbox"/>
<b>Activity 1.1</b>	Send a <b>message</b> in the <b>message tool</b> with the following details: <b>Name, Surname, Student number, Cell number and Email address.</b>	
<b>Activity 1.4</b>	Participate in the discussion forum:	
<b>Activity 1.5</b>	Complete <b>Activity 1.5</b> in the <b>eGuide</b>	
<b>TEMP</b>	<b>Stand in for the CEO if he/she does not pitch</b>	

<b>SECRETARY</b>		<input checked="" type="checkbox"/>
<b>Activity 1.1</b>	Send a <b>message</b> in the <b>message tool</b> with the following details: <b>Name, Surname, Student number, Cell number and Email address.</b>	
<b>Activity 1.3</b>	Create the discussion threads in the forum	
<b>Activity 1.4</b>	Participate in the discussion forum	
<b>Activity 1.5</b>	Complete <b>Activity 1.5</b> in the <b>eGuide</b>	
<b>TEMP</b>	<b>Stand in for the PR MANAGER if he/she does not pitch</b>	

<b>ANALYST</b>		<input checked="" type="checkbox"/>
<b>Activity 1.1</b>	Send a <b>message</b> in the <b>message tool</b> with the following details: <b>Name, Surname, Student number, Cell number and Email address.</b>	
<b>Activity 1.3</b>	Participate in the discussion forum	
<b>Activity 1.5</b>	Complete <b>Activity 1.5</b> in the <b>eGuide</b>	
<b>Activity 1.6</b>	Complete the Google form	
<b>TEMP</b>	<b>Stand in for the SECRETARY if he/she does not pitch</b>	

**GOOD LUCK!!!**

## Online Team Activity 2

### Well done!

Your groups managed to complete the first team activity and are now a part of the final team challenge for the rest of this semester – If you do your part, you WILL benefit from this challenge!!!

### DUE FINAL DUE DATE FOR THIS ACTIVITY IS THURSDAY 25 August 2015 23:00

For this activity – as for the ones to follow – each group member will have a specific job to do. Make sure you understand exactly what are expected of you – the success of your team members are in your hands.

As you know, we do have a TEMP system in place, just for incase a team member responsible for a specific part is abducted by aliens and cannot for fill his part:

- **The temp for the CEO is the PR MANAGER**
- **The temp for the PR MANAGER is the SECRETARY**
- **The temp for the SECRETARY is the ANALYST**
- **The temp for the ANALYST is the CEO**

#### Activity 2.1 (ALL TEAM MEMBERS)

As soon as you read this post, send a **message** to the **watsapp group** (that the PR Manager will create for your group) to confirm that you are on board and ready to partake in the activity. Use this whatsapp group to check up on one another and make sure no one is falling behind.

**REMEMBER:** Your team depends on you...don't let them down!!!

#### Activity 2.2 (ALL TEAM MEMBERS)

Watch the Video's (Episode 1 – Episode 5) on Elasticity. Links to the videos will be given in the eGuide.

#### Activity 2.3 (PR MANAGER)

Create a **watsapp** group for your team. You will find all their cellphone numbers in your previous messages in the messages tool on eFundl. If a team member **has not responded** to t Activity 2.1 by **MONDAY 17 AUGUST 9:00** the **PR Manager** should check up on them.

#### Activity 2.4 (SECRETARY)

Make a short summary of the **4 types of elasticity** and their categories of elasticity in MS Word. Send this summary to the **CEO** – ask for his/her preferred email address on the **watsapp** group and ask him/her to confirm if they received it. Your summary must be send to the CEO **BEFORE MONDAY 17 AUGUST 19:00**.

### Activity 2.5 (SECRETARY)

In the Forum tool on eFundi you will find a discussion forum named **Activity 2**. The topic for this forum is **Elasticity**. Create the following discussion threads in the forum.

- Price Elasticity of demand
- Income Elasticity of demand
- Cross price elasticity
- Price Elasticity of Supply

### Activity 2.6 (ANALYST)

Collect pictures of the **4 graphs of elasticity**. Save these pictures as JPG's and send them to the **CEO** – ask for his/her preferred email address on the **watsapp** group and ask him/her to confirm if they received it. Your summary must be send to the CEO **BEFORE MONDAY 17 AUGUST 19:00**.

### Activity 2.7 (CEO)

Use the summary and pictures of the graphs of elasticity to create a **mind map** for your team members. You can do this any way you like, however, you should be in an electronic format. You will find a link in the eGuide to a nice online mind mapping tool (Mind Mup) that is easy to use. Your **mind map** must be send to the rest of your group **BEFORE WEDNESDAY 19 AUGUST 13:00**.

### Activity 2.8 (PR MANAGER)

Make a formula page with all the **formulas of elasticity** and the interpretation of the **coefficients**. Your **formula page** must be send to the rest of your group **BEFORE WEDNESDAY 19 AUGUST 13:00**.

### Activity 2.9 (ALL TEAM MEMBERS)

Each group member should think of one scenario where each of the Elasticity principles can be applied on. For each scenario, also indicate (1) which graph will be relevant, (2) what formula you will use (3) and in which category it will fall. In the Forum tool on eFundi you will find a discussion forum named **Activity 2**. Write this in the **discussion threads** created by the secretary. Look at each other's scenarios and decide whether it is a valid match. Give positive feedback and tweak the scenarios until all members agree that it is a perfect example – This means that after this activity you will now have 4 different examples of scenarios of each principle, a mind map and a formula

### Activity 2.10 (ALL TEAM MEMBERS – INDIVIDUAL ACTIVITY)

Do the Test & Quiz (Activity 2.10) on eFundi – You will find the link in the eGuide – The **DUE DATE** for this activity is **TUESDAY 25 AUGUST 23:00**. **REMEMBER** to **continue** to **FEEDBACK** after you **submit for grading!!**

### Activity 2.11 (ALL TEAM MEMBERS – INDIVIDUAL ACTIVITY)

Complete group reflection form - You will find the link in the eGuide. The DUE DATE for this activity is **TUESDAY 25 AUGUST 23:00**.

### Self-evaluation checklist – did I do my part?

CEO		<input checked="" type="checkbox"/>
Activity 2.1	Send a whatsapp <b>message</b> to the group to confirm that you're on board	
Activity 2.2	Watch the Video's (Episode 1 – Episode 5) on Elasticity.	
Activity 2.7	Create a <b>mind map</b>	
Activity 2.9	Participate in the discussion forum:	
Activity 2.10	Complete <b>Activity 2.10</b> in the <b>eGuide</b>	
Activity 2.11	Complete <b>Activity 2.11</b> in the <b>eGuide</b>	
TEMP	<b>Stand in for the ANALYST if he/she does not pitch</b>	

PR MANAGER		<input checked="" type="checkbox"/>
Activity 2.1	Send a whatsapp <b>message</b> to the group to confirm you're on board	
Activity 2.2	Watch the Video's (Episode 1 – Episode 5) on Elasticity.	
Activity 2.3	Create a whatsapp group If a team member has not responded to Activity 2.1 by <b>MONDAY 17 AUGUST 9:00</b> you should track them down get them on board.	
Activity 2.8	Make a formula page with all the <b>formulas of elasticity</b>	
Activity 2.9	Participate in the discussion forum:	
Activity 2.10	Complete <b>Activity 2.10</b> in the <b>eGuide</b>	
Activity 2.11	Complete <b>Activity 2.11</b> in the <b>eGuide</b>	
TEMP	<b>Stand in for the CEO if he/she does not pitch</b>	

SECRETARY		<input checked="" type="checkbox"/>
Activity 1.1	Send a whatsapp <b>message</b> to the group to confirm you're on board	
Activity 2.2	Watch the Video's (Episode 1 – Episode 5) on Elasticity.	

Activity 2.4	Make a short summary of the <b>4 types of elasticity</b> and their categories	
Activity 2.5	Create the discussion threads in the forum	
Activity 2.9	Participate in the discussion forum:	
Activity 2.10	Complete <b>Activity 2.10</b> in the <b>eGuide</b>	
Activity 2.11	Complete <b>Activity 2.11</b> in the <b>eGuide</b>	
<b>TEMP</b>	<b>Stand in for the PR MANAGER if he/she does not pitch</b>	

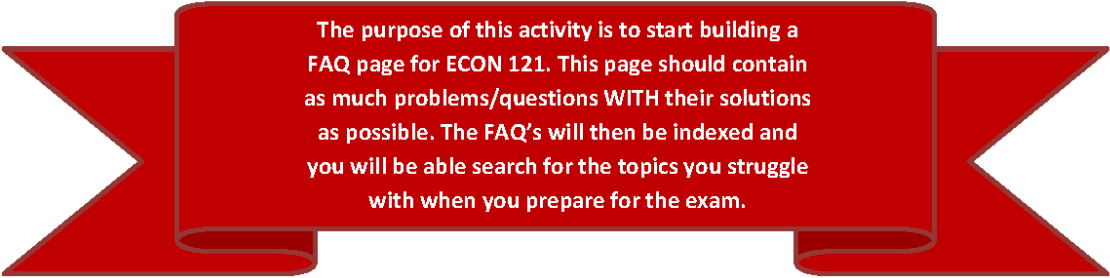
<b>ANALYST</b>		<input checked="" type="checkbox"/>
Activity 2.1	Send a whatsapp <b>message</b> to the group to confirm you're on board	
Activity 2.2	Watch the Video's (Episode 1 – Episode 5) on Elasticity.	
Activity 2.6	Collect pictures of the <b>4 graphs of elasticity</b> .	
Activity 2.9	Participate in the discussion forum:	
Activity 2.10	Complete <b>Activity 2.10</b> in the <b>eGuide</b>	
Activity 2.11	Complete <b>Activity 2.11</b> in the <b>eGuide</b>	
<b>TEMP</b>	<b>Stand in for the SECRETERY if he/she does not pitch</b>	

**GOOD LUCK!!!**

## Online Team Activity 3

Dear student

I hope all of you are still well and up to date. We understand it is hard sometimes but please try to keep up. You and your fellow students will benefit **ALOT** from the next activity.



The purpose of this activity is to start building a FAQ page for ECON 121. This page should contain as much problems/questions WITH their solutions as possible. The FAQ's will then be indexed and you will be able search for the topics you struggle with when you prepare for the exam.

**DUE FINAL DUE DATE FOR THIS ACTIVITY IS  
FRIDAY 2 October 2015 23:00**

For this activity – as for the ones to follow – each group member will have a specific job to do. Make sure you understand exactly what are expected of you – the success of your team members are in your hands.

We will still use the TEMP system, just for incase a team member responsible for a specific part cannot for fill his part:

- The temp for the CEO is the PR MANAGER
- The temp for the PR MANAGER is the SECRETARY
- The temp for the SECRETARY is the ANALYST
- The temp for the ANALYST is the CEO

### Activity 3.1 (ALL TEAM MEMBERS)

As soon as you read this post, send a message to the whatsapp group to confirm that you are on board and ready to partake in the activity. Use this whatsapp group to check up on one another and make sure no one is falling behind. **REMEMBER:** Your team depends on you...don't let them down!!!

### Activity 3.2 (ANALYST)

Create a sub-page on the FAQ's page. Change the page title to your team's name.  
Create 4 more subpages on your team's page. Name these pages CEO, ANALYTS, SECRETARY, PR MANAGER (**Instructions in eGuide**)

### Activity 3.3 (ALL TEAM MEMBERS)

Think back at the work that you've done up until now. Post at **least ONE** question or problem that you do not know how to solve or do not understand from **Chapter 6, 7 9 10 or 11**. Use the **Add text** option to post these questions/problems on your subpage. (Instructions in eGuide). Use the Chapter number and topic name as your heading. (e.g. Chapter 6 –Elasticity). If you have more than one question, feel free to post them as well – but rather focus on one good question. Make sure that you state your problem clearly so that your group members will understand what you are asking and try to help you to solve it.

### Activity 3.4 (ALL TEAM MEMBERS)

Use the **Add Text** and **Add comments tool** to try and solve the problems of your fellow team members (Instructions in eGuide). Its fine to edit each other's posts and comments as long as you work together to try and formulate the most perfect answer for the stated question/problem.

**NB!!** You can also add video clips or pictures as part of your solution – especially when the solution contains graphs or calculations (Instructions in eGuide).

**DUE DATE** for activity 3.4 is **Tuesday 29 September 8:00**.

### Activity 3.5 (ALL TEAM MEMBERS – INDIVIDUAL ACTIVITY)

Submit your question PLUS the answer that was formulated by your group on the form (link in eGuide) before **Wednesday 30 September 23:00**.

#### **NB!!**

1. If your group were not able to solve your problem/question – **do not submit your question YET!!!** (Read Activity 3.6)
2. If your problem or solution contains **pictures OR videos**, you will have to submit the problem and solution by **email** and not via the form – Use the Chapter and Topic as the Subject (e.g. Chapter 6 –Elasticity) and attach

### Activity 3.6 (ALL TEAM MEMBERS – INDIVIDUAL ACTIVITY)

Click on the link in the eGuide to open the FAQ's page where all the other groups posted their questions and answers. Use the search function to find your topic and see if one of the other groups were able to solve a similar problem. IF you searched for all related key words ( In Afrikaans and English) and found **NO** other FAQ that is similar to yours, submit your question on the **PLEASE HELP** form (link in eGuide). The lecturers and assistants will then take a look at those questions and will try to add it to the FAQ's page.

### Activity 3.7 (ALL TEAM MEMBERS – INDIVIDUAL ACTIVITY)

Complete group reflection form - You will find the link in the eGuide. The **DUE DATE** for this activity is **Friday 2 October 23:00**

## Self-evaluation checklist – did I do my part?

CEO		<input checked="" type="checkbox"/>
<b>Activity 3.1</b>	Send a whatsapp <b>message</b> to the group to confirm that you're on board	
<b>Activity 3.3</b>	Post question / problem that you do not understand in the CEO page	
<b>Activity 3.4</b>	Help team members to find a suitable answer for their problems	
<b>Activity 3.5</b>	Submit your problem /question and the answer (if your group was able to solve it) to the form in the eGuide	
<b>Activity 3.6</b>	IF your team could not solve your problem, search for a solution in the FAQ page in the eGuide	
	If you can't find any answers related to your problem, submit your problem on the <b>PLEASE HELP</b> form in the eGuide	
<b>Activity 3.7</b>	Complete <b>Activity 3.7</b> in the <b>eGuide</b>	
<b>TEMP</b>	<b>Stand in for the ANALYST if he/she does not pitch</b>	

PR MANAGER		<input checked="" type="checkbox"/>
<b>Activity 3.1</b>	Send a whatsapp <b>message</b> to the group to confirm that you're on board	
<b>Activity 3.3</b>	Post question / problem that you do not understand in the CEO page	
<b>Activity 3.4</b>	Help team members to find a suitable answer for their problems	
<b>Activity 3.5</b>	Submit your problem /question and the answer (if your group was able to solve it) to the form in the eGuide	
<b>Activity 3.6</b>	IF your team could not solve your problem, search for a solution in the FAQ page in the eGuide	
	If you can't find any answers related to your problem, submit your problem on the <b>PLEASE HELP</b> form in the eGuide	
<b>Activity 3.7</b>	Complete <b>Activity 3.7</b> in the <b>eGuide</b>	

SECRETARY		<input checked="" type="checkbox"/>
<b>Activity 3.1</b>	Send a whatsapp <b>message</b> to the group to confirm that you're on board	
<b>Activity 3.3</b>	Post question / problem that you do not understand in the CEO page	
<b>Activity 3.4</b>	Help team members to find a suitable answer for their problems	
<b>Activity 3.5</b>	Submit your problem /question and the answer (if your group was able to solve it) to the form in the eGuide	
<b>Activity 3.6</b>	IF your team could not solve your problem, search for a solution in the FAQ page in the eGuide	
	If you can't find any answers related to your problem, submit your problem on the <b>PLEASE HELP</b> form in the eGuide	
<b>Activity 3.7</b>	Complete <b>Activity 3.7</b> in the <b>eGuide</b>	

<b>ANALYST</b>		<input checked="" type="checkbox"/>
<b>Activity 3.1</b>	Send a whatsapp <b>message</b> to the group to confirm that you're on board	
<b>Activity 3.2</b>	Create Sub-pages on the FAQ page	
<b>Activity 3.3</b>	Post question / problem that you do not understand in the CEO page	
<b>Activity 3.4</b>	Help team members to find a suitable answer for their problems	
<b>Activity 3.5</b>	Submit your problem /question and the answer (if your group was able to solve it) to the form in the eGuide	
<b>Activity 3.6</b>	IF your team could not solve your problem, search for a solution in the FAQ page in the eGuide	
	If you can't find any answers related to your problem, submit your problem on the <b>PLEASE HELP</b> form in the eGuide	
<b>Activity 3.7</b>	Complete <b>Activity 3.7</b> in the <b>eGuide</b>	

**GOOD LUCK!!!**

## Online Team Activity 4

This is your final Activity for the ECON 121 TEAM CHALLENGE. For this activity you will not only work online but also have to schedule a face-to-face meeting to complete the final section.

Good luck and Enjoy!!

**DUE FINAL DUE DATE FOR THIS ACTIVITY IS**

**Friday 2 October 2015 23:00**

For this activity – as for the ones to follow – each group member will have a specific job to do. Make sure you understand exactly what are expected of you – the success of your team members are in your hands.

We will still use the TEMP system, just for incase a team member responsible for a specific part cannot for fill his part:

- The temp for the CEO is the PR MANAGER
- The temp for the PR MANAGER is the SECRETARY
- The temp for the SECRETARY is the ANALYST
- The temp for the ANALYST is the CEO

### Activity 4.1 (ALL TEAM MEMBERS)

As soon as you read this post, send a message to the whatsapp group to confirm that you are on board and ready to partake in the activity. Use this whatsapp group to check up on one another and make sure no one is falling behind. **REMEMBER:** Your team depends on you...don't let them down!!!

### Activity 4.2 (SECRETARY)

Schedule a group meeting at a location where you'll be able to sit and work together AND have access to the internet.

### Activity 4.3 (CEO)

Study and summarize all the formulas for consumption - this includes consumption including tax as well as savings. Bring a copy of your summary for each team member along to the team meeting.

**Activity 4.4 (PR MANAGER)**

Study and summarize how to graphically illustrate equilibrium. Bring a copy of your summary for each team member along.

**Activity 4.5 (ANALYST)**

Study and summarize how to calculate change – this includes the theory and the formulas. Bring copy of your summary for each team member along.

**Activity 4.6 (SECRETARY)**

Study and summarize what  $c$  = Marginal propensity to consume AND  $m$  = Marginal propensity to import stand and mean. Also include the formulas for the Multiplier and Equilibrium in your summary. Bring a copy of your summary for each team member along.

**Activity 4.7 (ALL TEAM MEMBERS)**

Do Activity 4.7 in the Assignment tool on eFundI as a group activity. Any team member can open the assignment of eFundI to view instructions.

**Activity 4.8 (CEO)**

The CEO should submit the final group assignment (Instructions in Activity 4.6 in the Assignment tool on eFundI)

### Self-evaluation checklist – did I do my part?

CEO		<input checked="" type="checkbox"/>
Activity 4.1	Send a message to the whatsapp group	
Activity 4.3	Study and summarize all the formulas for consumption Bring copy of Summary to team meeting	
Activity 4.7	Complete Activity 4.7 in the Assignment tool on eFundi at the team meeting	
Activity 4.8	The CEO should submit the final group assignment	

PR MANAGER		<input checked="" type="checkbox"/>
Activity 4.1	Send a message to the whatsapp group	
Activity 4.4	Study and summarize how to graphically illustrate equilibrium. Bring copy of Summary to team meeting	
Activity 4.7	Complete Activity 4.7 in the Assignment tool on eFundi at the team meeting	

SECRETARY		<input checked="" type="checkbox"/>
Activity 4.1	Send a message to the whatsapp group	
Activity 4.2	Schedule a group meeting	
Activity 4.6	Study and summarize what $c$ = Marginal propensity to consume AND $m$ = Marginal propensity to import stand and mean. Also include the formulas for the Multiplier and Equilibrium in your summary. Bring copy of Summary to team meeting	
Activity 4.7	Complete Activity 4.7 in the Assignment tool on eFundi at the team meeting	

ANALYST		<input checked="" type="checkbox"/>
Activity 4.1	Send a message to the whatsapp group	
Activity 4.5	Study and summarize how to calculate change Bring copy of Summary to team meeting	
Activity 4.7	Complete Activity 4.7 in the Assignment tool on eFundi at the team meeting	

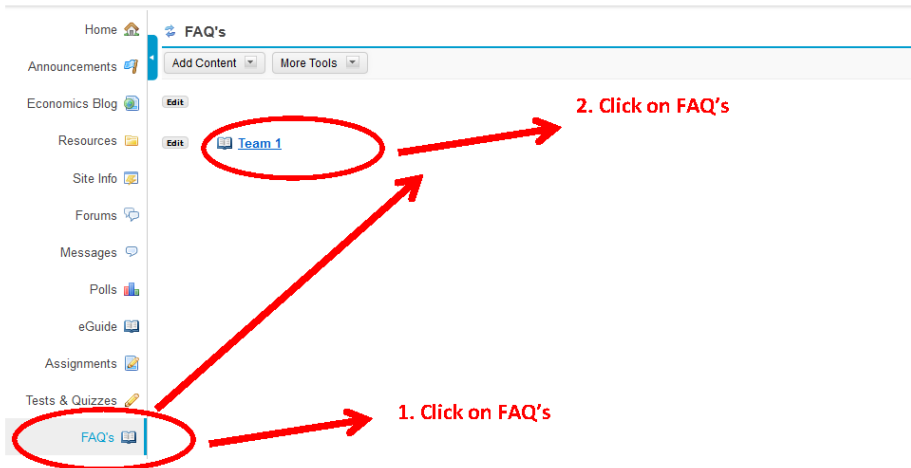
**GOOD LUCK!!!**



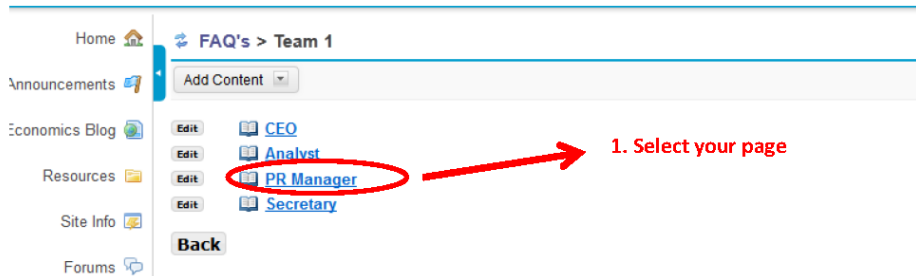
# ADDENDUM D STUDENT USER GUIDE

## How to post your Question/ Problem

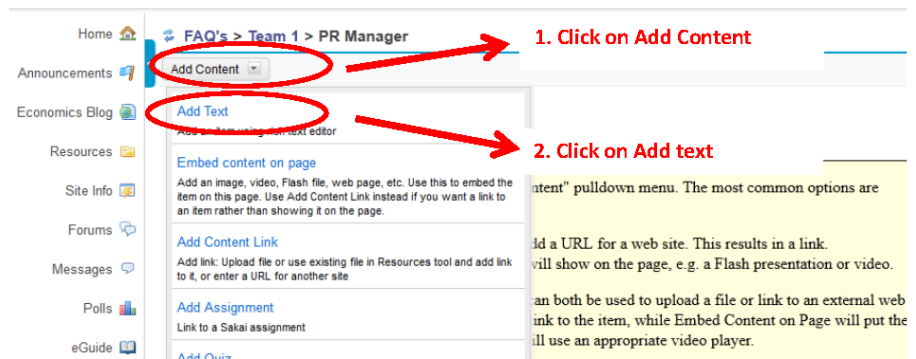
### Step 1



### Step 2

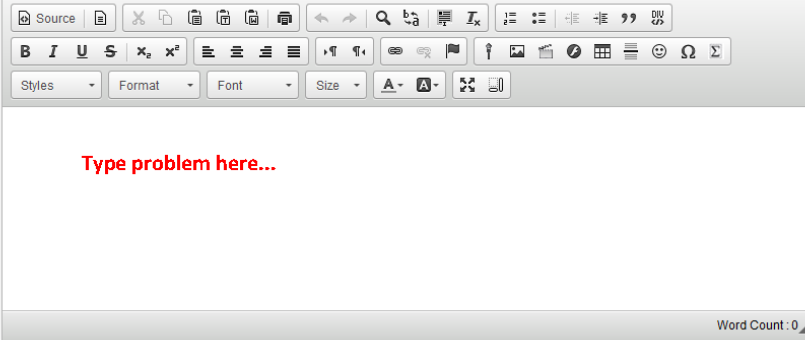


### Step 3



## Step 5

Adding text to: PR Manager



Word Count: 0

Don't Release Item Until All Prerequisites are Completed

[Edit the groups for which this item should be shown](#)

**Save** **Cancel**

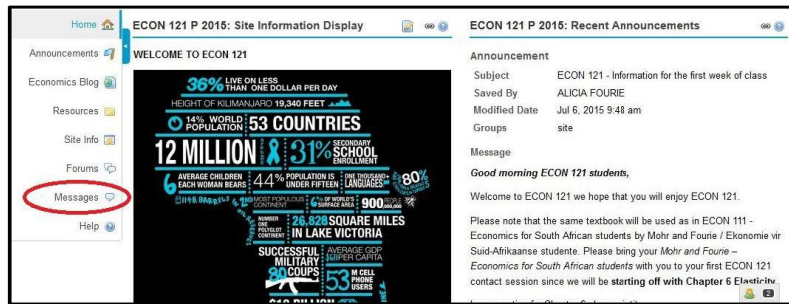
2. Click on Save

NB!!

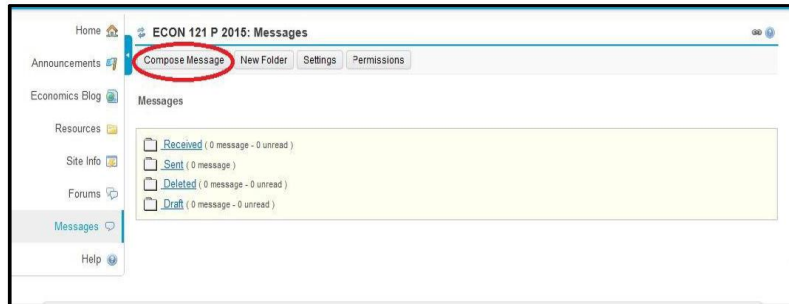
Use these steps to comment on your team member's questions / problems as well

# How to send messages to your Team

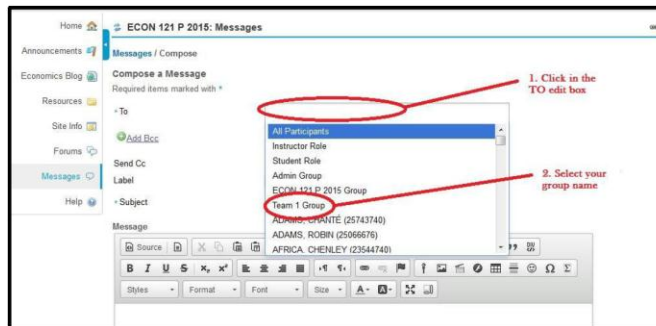
1



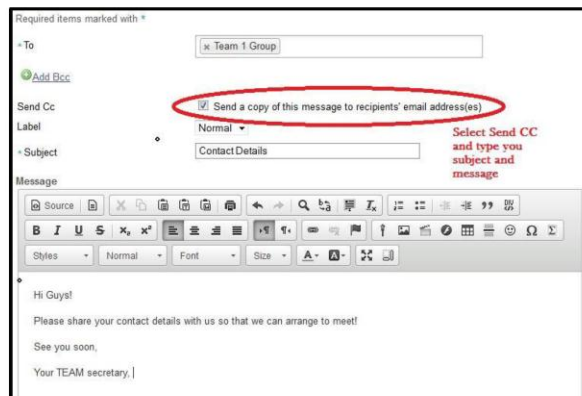
2



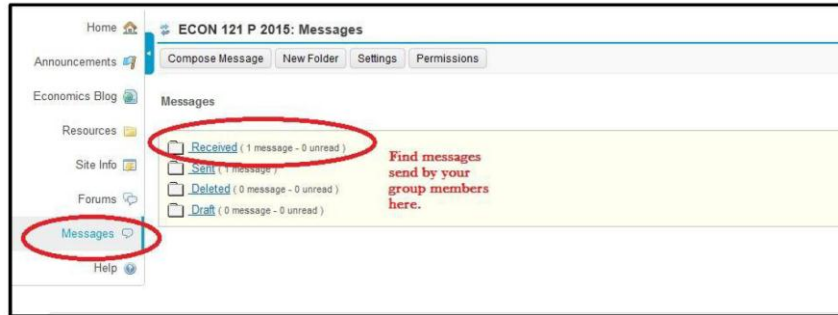
3



4

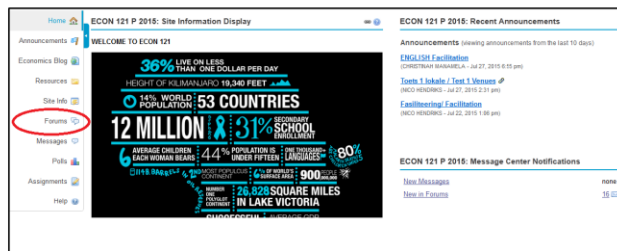


5

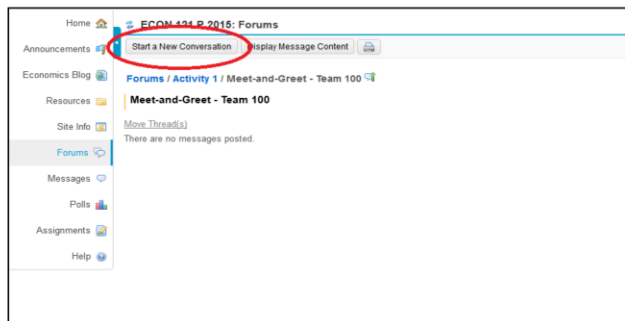


## How to create discussion threads in the forum

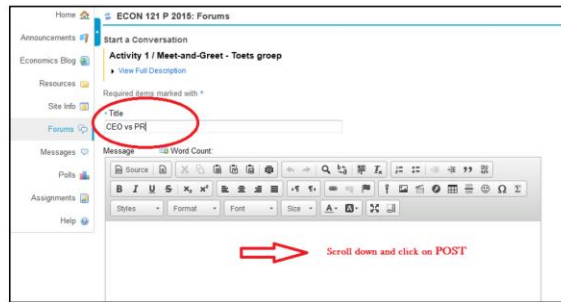
1



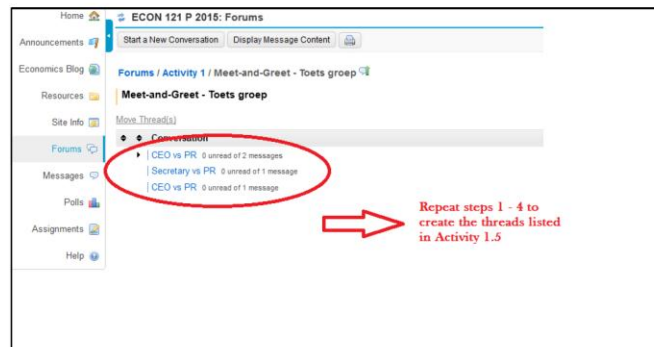
2



3

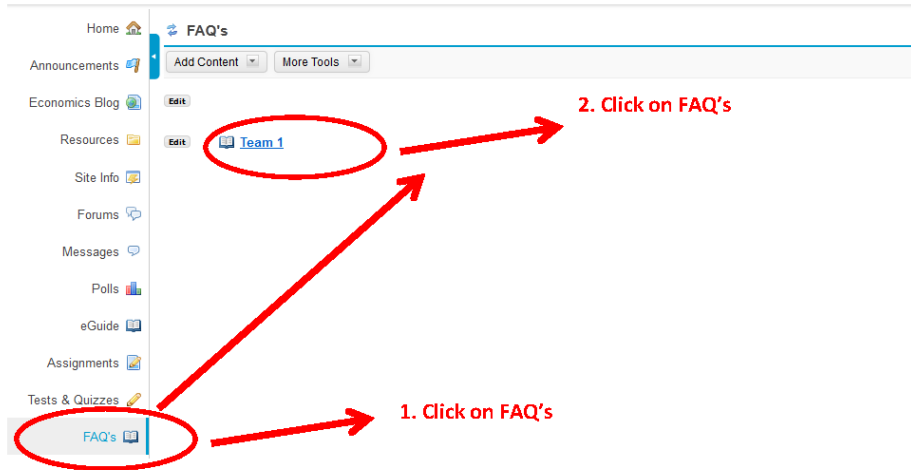


4

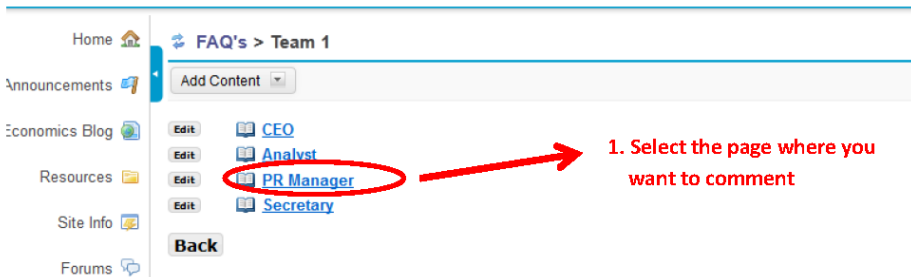


# How to add a picture or video clip

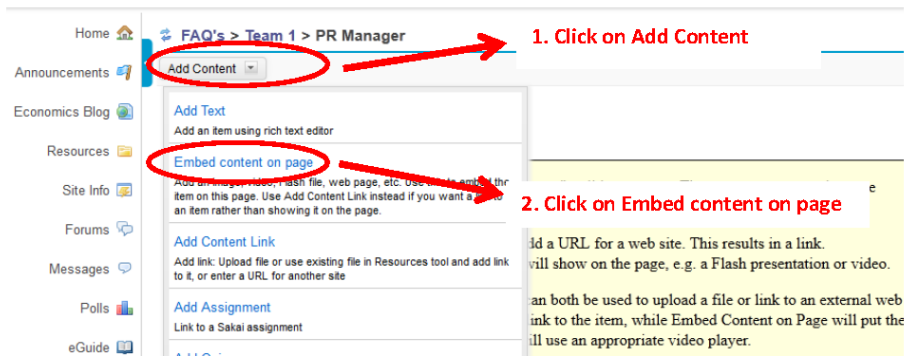
## Step 1



## Step 2



## Step 3



# Step 5

Home

Announcements

Economics Blog

Resources

Site Info

Forums

Messages

Polls

eGuide

Assignments

**Embed content on page**

You may upload a new file, select an existing file from Resources, or supply a URL to a file on the web.

[Frequently Asked Questions about multimedia content](#)

Upload file

**Browse...** No file selected.

Or select an existing resource

Or add a URL or "embed code"

Don't Release Item Until All Prerequisites are Compl....

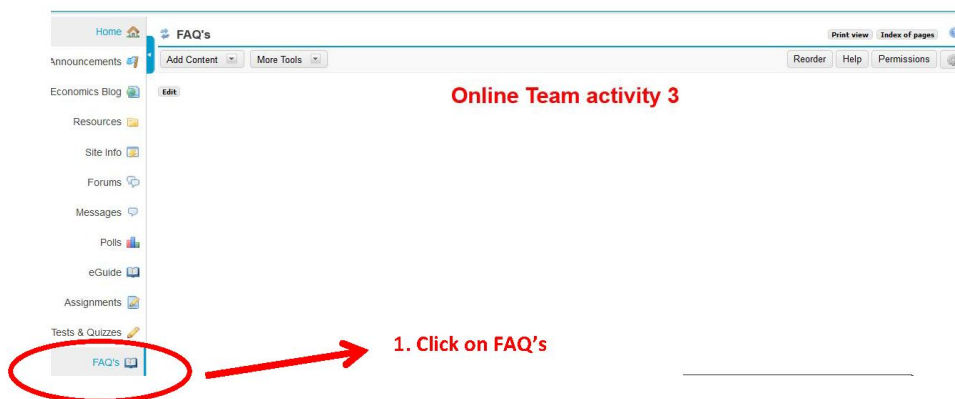
**Save** Cancel

**1. Click on Browse to select the file you want to upload from your hard drive or memory stick**

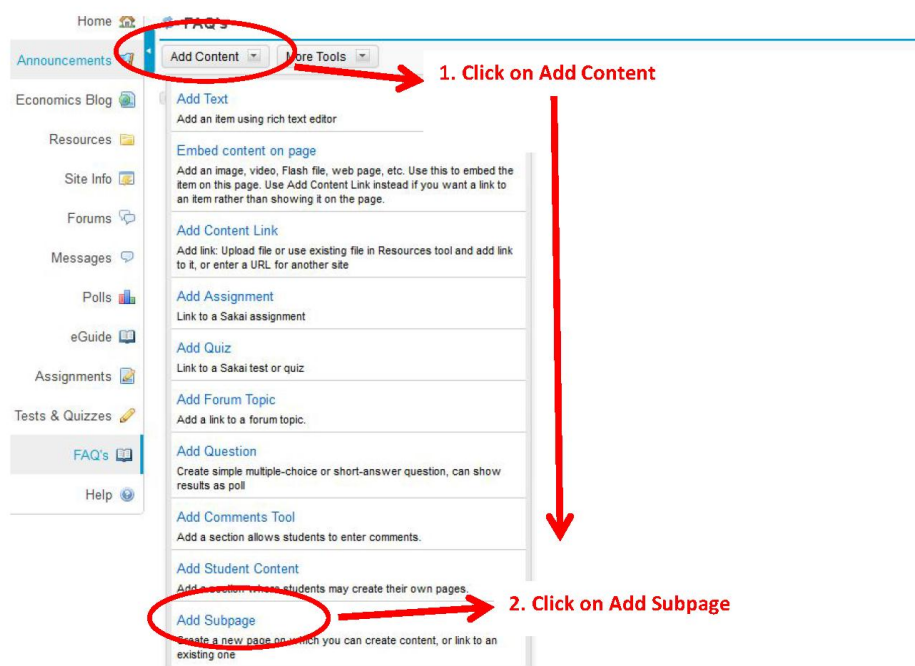
**2. Click on Save**

# How to Create a Sub-page on FAQ page

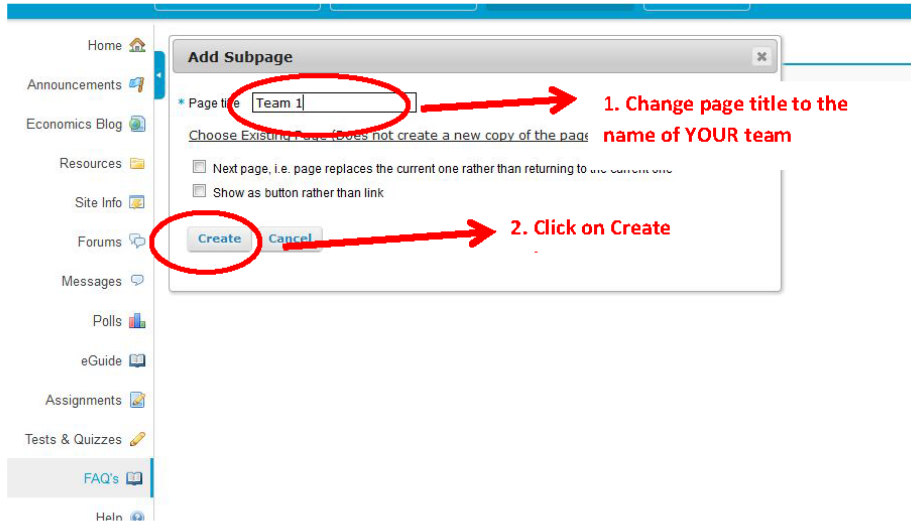
## Step 1



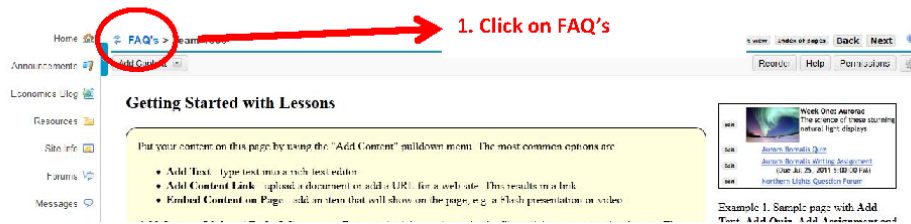
## Step 2



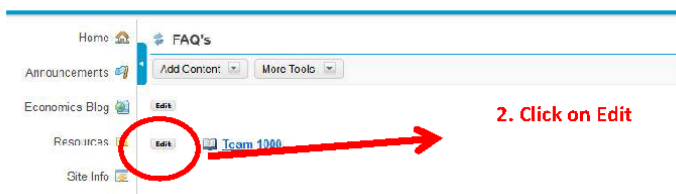
### Step 3



### Step 4



### Step 5



## Step 6

**Edit Item**

Item Name

Path (in Resources)

Item Description

**Change Page**

Next page, i.e. page replaces the current one rather than returning to the current one

Show as button rather than link

Don't Release Item Until All Prerequisites are Completed

Require This Item

**Edit the groups for which this item should be shown**

1. Click on Edit the groups...

## Step 7

Team228

Team232

Test team

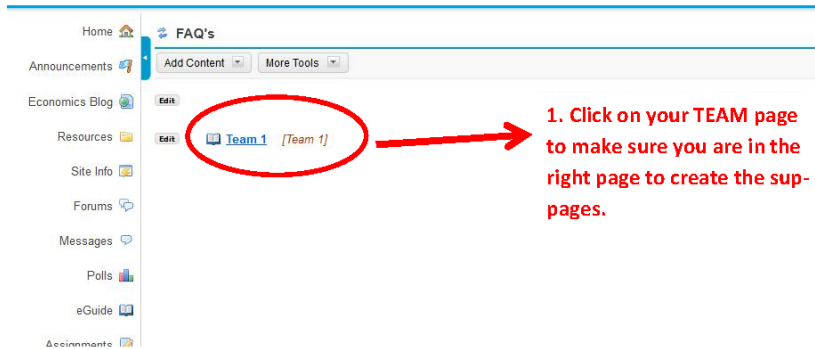
dream-team

1. Select YOUR team name from list

2. Click on Update Item

# To create the Sub-pages for your team members on your team page:

## 1. Make sure you are in your TEAM page

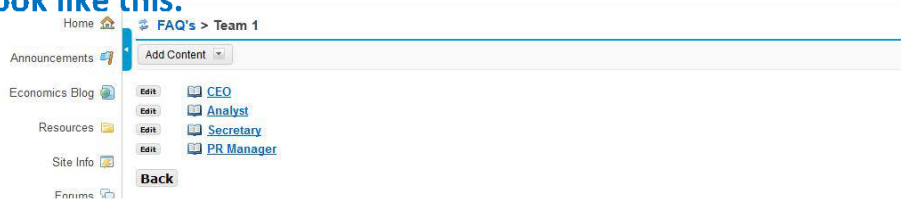


## 2. Repeat step 2 & 3 to create a Sup-page for each of your team members. Name

**NB!!!! Make sure you select your MAIN team page before creating the next subpage.**



## 3. After completing all the steps, your TEAM page should look like this:



**ADDENDUM E**  
**GROUP TASK**

**ECON 121 OPDRAG 1**  
**ECON 121 ASSIGNMENT 1**

**Instruksies:**

- **Werk in groepe van 5-6. Nie 1, 2, 3, 4, of 7 nie – 5-6.**
- **Datum van inhandiging: 18 September 09h00 – 12h00 in E3-K101**

**Instructions:**

- **Work in groups of 5-6. Not 1,2,3,4 or 7 5-6.**
- **Date of submission: 18 September 09h00-11h00 in E3-K101**

**Vraag 1**

**[30]**

'n Paar jaar gelede het bewerings die rondte gedoen dat die Klipoog-Kafeterië in die SS 'n monopolie is. Gestel jy en jou kollegas is deel van 'n ondersoekspan vir Carte Blanche. Doen ondersoek na hierdie bewerings en skryf dan 'n kort verslag oor julle bevindings: is die Klipoog wel 'n monopolie, of nie?

Ten einde julle bevindings te staaf, moet julle bewys lewer van die volgende:

- Vergelyk die prys van 'n gewone hamburger en tjijs tussen die Klipoog en minstens 3 ander verskaffers op kampus of op die Bult.
- Is prys alleen 'n aanduiding van 'n firma se monopolie mag? Verskaf 'n volledige ontleding van die kitskosmark op kampus en die Bult, en dui aan of dit die idee dat die Klipoog 'n monopolie is ondersteun of nie.

**Vraag 2**

**[30]**

Ontwerp jou eie "infographic". Op hierdie "infographic" verduidelik wat inflasie is.

Wenk: Wat is 'n infographic?

"Information graphics or infographics are graphic visual representations of information, data or knowledge intended to present information quickly and clearly. They can improve cognition by utilizing graphics to enhance the human visual system's ability to see patterns and trends. Similar pursuits are information visualization, data visualization, statistical graphics, information design, or information architecture." *Wikipedia*

**Question 1**

**[30]**

A few years ago, allegations went around that the Klipoog Cafeteria in the SS is a monopoly. Suppose you and your colleagues are part of an investigative team for Carte Blanche. Investigate these allegations and then write a short report about your findings: is the Klipoog indeed a monopoly, or not?

In order to support your findings, you must show evidence of the following:

- Compare the price of a regular hamburger and chips between the Klipoog and at least 3 other suppliers on campus or on the Bult.
- Is price alone an indicator of a firm's monopoly power? Provide a full analysis of the fast food market on campus and on the Bult, and indicate whether this supports the idea that the Klipoog is a monopoly, or not.

**Question 2**

**[30]**

Design your own "infographic". On the infographic explain what inflation is.

Hint: What is an infographic?

"Information graphics or infographics are graphic visual representations of information, data or knowledge intended to present information quickly and clearly. They can improve cognition by utilizing graphics to enhance the human visual system's ability to see patterns and trends. Similar pursuits are information visualization, data visualization, statistical graphics, information design, or information architecture." *Wikipedia*

**Vraag 3****[15]**

Lees die aangehegte artikel uit Fin24 "SA's unemployment rate hits 12 year high".

1. Doen navorsing en toon die werkloosheids-syfer vir Suid-Afrika grafies aan vir die afgelope 12 jaar. (Maak gebruik van 'n "bar chart" in Ms Excel). (5)
2. Wat is sommige van die belangrikste redes vir die hoë vlakke van werkloosheid in Suid-Afrika? (5)
3. Wat kan Suid-Afrika doen om werkloosheid in Suid-Afrika te verlig? (5)

**Question 3****[15]**

Read the attached article from Fin24 "SA's unemployment rate hits 12 year high".

1. Do research and illustrate the unemployment rates for South Africa for the past 12 years. (Make use of a bar chart in Ms Excel) (5)
  2. What are some of the most important reasons for the high levels of unemployment in South Africa? (5)
- What can South Africa do to relieve unemployment in South Africa? (5)

## SA's unemployment rate hits 12-year high

May 26 2015 13:42 Matthew le Cordour



Cape Town – South Africa's unemployment rate in the first quarter of 2015 was at its highest level since 2003, according to Statistics SA, which released its quarterly labour force survey in Cape Town on Tuesday.

Statistician-general Pali Lehohla said South Africa's unemployment level increased to 26.4%, the highest level since 2003, when it hit 30%.

"It was stable at about 24% since 2003 and this spike is a new phenomenon," he said.

"Unemployment figures always drop in the first quarter of the year because of the impact of the festive season and Christmas, but this result is below the usual dip," said Kefiloe Masiteng, deputy director-general in charge of social statistics.

The results of the first quarter shows that the working age population was 35.8 million, which included 15.5 million employed, 5.5 million unemployed and 14.8 million not economically active.

"Thus resulting in an unemployment rate of 26.4%, absorption rate of 43.2% and labour force participation rate of 58.6%," said Lehohla.

Lehohla told Fin24 that the high unemployment numbers might not be the worst sign for South Africa.

South Africa's employment rate increased by 1.8% year-on-year (y/y) to 15.5 million people.

He said the fact that there was an increase in employment created an environment of optimism. This optimism encouraged more people to ask for jobs, thus reflecting an increase in unemployment.



(Shutterstock)

### RELATED ARTICLES

- State wage deal to cost extra R66bn
- Skilled trades, engineers most wanted in SA - survey
- Job security worsens in South Africa - report
- Economy is not working, Patel told
- Load shedding contributes to GDP slowdown
- SA GDP increase slows to 1.3%

**TOTAAL / TOTAL 75**

# ADDENDUM F

## STUDENT CONSENT FORM

### VOLUNTARY CONSENT FORM (ATTACHED TO ONLINE QUESTIONNAIRE)

#### PARTICIPATION IN RESEARCH PROJECT IN THE ECON 121 MODULE

Dear participant

Thank you for your time and for making an informed decision.

Please provide me with your consent by reading through section 1 and 2.

**BY COMPLETING THE QUESTIONNAIRE YOU AGREE TO THE INFORMATION GIVEN IN THE ABOVE STATED SECTIONS AND THEREFORE GIVE CONSENT TO PARTICIPATE IN THIS RESEARCH PROJECT.**

If you do not wish to participate in this research by not completing the questionnaire, it will not be held against you, as participation is voluntary.

Yours faithfully

Chantelle Bosch

#### SECTION 1: GENERAL PROJECT INFORMATION

**1. Project title:**

Promoting self-directed learning through the implementation of cooperative learning in a higher education blended learning environment

**2. Institution:**

North-West University, Faculty of Education Sciences

**3. Names and contact information:**

Contact person		Project leader	
Title, name, surname	Ms Chantelle Bosch	Title, name, surname	Prof Elsa Mentz
Qualification	MEd	Qualification	PhD
Telephone (work)	018 299 4768	Telephone (work)	018 299 4780
Cellphone	0828385498		

**4. Purpose of the project:**

This study aims to evaluate the influence of CL in a blended learning environment on students' intrinsic motivation. Learners will be asked to complete the questionnaire to establish their level of Intrinsic motivation and Self-directed learning at the beginning of the module. At the end of the module, the questionnaire will be completed once again to determine whether there are any changes in their level of SDL.

**5. What will be expected of the participants:**

Students will only be expected to complete the two questionnaires referred to above. A random sample of the students will be contacted to participate in semi-structured interviews.

**6. Participants' confidentiality will be ensured in the following way:**

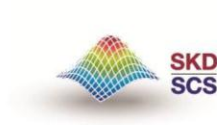
The questionnaires will be completed online; student numbers will therefore be required for the results. The researcher will, however, ensure that the information is treated confidentially. Data will be extracted immediately after completion and no access to results will be possible via the internet. Results will be saved on an external storage medium, which will be kept in a safe place.

**SECTION 2: GENERAL PRINCIPLES**

**It is important to understand and take into consideration the following before deciding to participate in this project:**

1. It is possible that you will not personally derive any benefit from your participation in the project. However, the results may help to benefit students in the future.
2. By agreeing to participate in the project, you also consent that the data that will be generated by the researcher may be used for scientific purposes.
3. Your participation remains voluntary and you may at any time withdraw from the research.
4. Your personal information will be treated as confidential at all times.
5. Should you be interested, the research findings will be made available to you.

**ADDENDUM G**  
**LETTER FROM STATISTICAL CONSULTATION SERVICE OF THE**  
**NORTH-WEST UNIVERSITY**



Private Bag X6001, Potchefstroom  
South Africa 2520

Tel: 018 299-1111/2222  
Web: <http://www.nwu.ac.za>

**Statistical Consultation Services**  
Tel: +27 18 285 2447  
Fax: +27 0 87 231 5294  
Email: [monique.vandeventer@nwu.ac.za](mailto:monique.vandeventer@nwu.ac.za)

22 April 2016

**Re: Thesis, Ms C Bosch, student number: 21393273**

We hereby confirm that the Statistical Consultation Services of the North-West University analysed the data involved in the study of the above-mentioned student and assisted with the interpretation of the results. However, any opinion, findings or recommendations contained in this document are those of the author, and the Statistical Consultation Services of the NWU (Potchefstroom Campus) do not accept responsibility for the statistical correctness of the data reported.

Kind regards

A handwritten signature in black ink, appearing to read 'SM Ellis'.

**Dr SM Ellis (Pr. Sci. Nat)**

**Head Subject Specialist: Statistical Consultation Services**

**ADDENDUM H**  
**LETTER FROM LANGUAGE EDITOR**

**Elzet Kirsten Blaauw**  
Translating & editing – English/Afrikaans  
e: elzetkirsten@gmail.com c: 072 7972952

23 De Zuide Werf  
Ringwood Drive  
Parklands, Cape Town  
7441

9 May 2016

To Whom It Might Concern

**CONFIRMATION OF LANGUAGE EDITING**

I hereby confirm that I, Elzet Blaauw, have edited the doctoral dissertation *Promoting self-directed learning through the implementation of cooperative learning in a higher education blended learning environment* to be submitted by Chantelle Bosch.

In addition to editing, I have also suggested certain changes with regards to formulation. These suggestions and all changes have been done with the track changes function in MS Word and can be requested if necessary.

I confirm that I am a professional language practitioner. I have obtained an MPhil degree in translation and editing (cum laude, 2012) from Stellenbosch University and I have more than three years' experience editing postgraduate research documents.

Please do not hesitate to contact me with any further queries.

Kind regards



Elzet Blaauw

# ADDENDUM I

## ETHICS APPROVAL



NORTH-WEST UNIVERSITY  
YUNIBESITHI YA BOKONE-BOPHIRIMA  
NOORDWES-UNIVERSITEIT

Private Bag X6001, Potchefstroom  
South Africa 2520

Tel: (018) 299-4900  
Faks: (018) 299-4910  
Web: <http://www.nwu.ac.za>

**Ethics Committee**  
Tel +27 18 299 4852  
Email [Ethics@nwu.ac.za](mailto:Ethics@nwu.ac.za)

1 July 2013

### ETHICS APPROVAL OF PROJECT

The North-West University Ethics Committee (NWU-EC) hereby approves your project as indicated below. This implies that the NWU-EC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the project may be initiated, using the ethics number below.

<b>Project title:</b> TEACHING AND LEARNING STRATEGIES TO PROMOTE SELF-DIRECTED LEARNING															
<b>Project Leader:</b> : Prof E Mentz															
<b>Ethics number:</b>	N	W	U	-	0	0	0	1	0	-	1	3	-	A	2
	Institution				Project Number						Year			Status	
	Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation														
<b>Approval date:</b> 2013/02/14								<b>Expiry date:</b> 2018/02/13							

Special conditions of the approval (if any): None

<p><b>General conditions:</b></p> <p>While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following:</p> <ul style="list-style-type: none"><li>• The project leader (principle investigator) must report in the prescribed format to the NWU-EC:<ul style="list-style-type: none"><li>- annually (or as otherwise requested) on the progress of the project,</li><li>- without any delay in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.</li></ul></li><li>• The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the project, the project leader must apply for approval of these changes at the NWU-EC. Would there be deviation from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.</li><li>• The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date, a new application must be made to the NWU-EC and new approval received before or on the expiry date.</li><li>• In the interest of ethical responsibility the NWU-EC retains the right to:<ul style="list-style-type: none"><li>- request access to any information or data at any time during the course or after completion of the project;</li><li>- withdraw or postpone approval if:<ul style="list-style-type: none"><li>· any unethical principles or practices of the project are revealed or suspected,</li><li>· it becomes apparent that any relevant information was withheld from the NWU-EC or that information has been false or misrepresented,</li><li>· the required annual report and reporting of adverse events was not done timely and accurately,</li><li>· new institutional rules, national legislation or international conventions deem it necessary.</li></ul></li></ul></li></ul>
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The Ethics Committee would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the Ethics Committee for any further enquiries or requests for assistance.

Yours sincerely

Prof Amanda Lourens  
(chair NWU Ethics Committee)

**ADDENDUM J**  
**QUALITATIVE DATA FROM ATLAS.TI AVAILABLE ON CDROM AT**  
**THE BACK OF THE DISSERTATION.**